

THE NIDIFICATION
OF
BIRDS OF THE INDIAN EMPIRE

BY
E. C. STUART BAKER, C.I.E., O.B.E., F.Z.S. ETC.

VOLUME IV.
PANDIONIDÆ—PODICEPIDÆ.

WITH SEVEN PLATES.

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PREFACE.

THE present volume, the fourth, completes my work on the 'Nidification of the Birds of the Indian Empire,' and comparison with previous standards of knowledge, as shown by earlier works, can now be made.

In the first edition of 'The Fauna,' begun in 1889, 1,617 species of birds were enumerated, plus 14 in the Addenda, or 1,631 in all; of these, the breeding habits and eggs of roughly 40 per cent. were then unknown. When I wrote the second edition of the Birds in that work it contained descriptions of 2,293 species and subspecies of birds. To these 54 were added in the volumes of Corrigenda and Addenda, making a total of 2,347, to which a few more have again been added since they were written, raising the number to 2,351. Of these, the breeding of 1,723 species and subspecies is now recorded, more or less fully, in the present volumes; of the residue, 349, the nidification of which is also known, breed in other countries, while there remain no less than 279 species and subspecies of whose nidification nothing is known at all, nearly 12 per cent. of the whole number. Since the earlier volumes of the present work were printed and the fourth volume written, considerable further additions to the Avifauna of India and Burma have been made, owing, principally, to the great work done by the Verney Survey of Southern India and by other important, though smaller, collections made in Burma, the principal of these being that made by Stockley in North East Burma.

The grand material furnished by the Verney Survey, which is being worked out by Messrs. N. B. Kinnear and H. Whistler, has enabled many new races to be satisfactorily defined, while Stockley's work has added certain forms to the Burmese Avifauna which had hitherto been believed to be entirely extra-limital.

Although the present four volumes show that an immense advance has taken place in our knowledge of bird-life since Hume's second edition of 'Nests and Eggs' was written in 1892, it also proves that there is yet a very great deal left for us to discover. As already shown, the nidification of nearly 12 per cent. of our birds is still a complete blank, while there are many others concerning which our knowledge is incomplete in respect even to the simplest facts. In the vast majority, moreover, we still have to learn much in regard to incubation and other details which await elucidation by our field-naturalists.

Perhaps in writing this, the preface to the final volume, I may be forgiven if I again refer to the ethics of egg-collecting, especially as of late so much has been said and done to deter all work of this nature. May I once more start with the premise that no one should start egg-collecting unless they have some scientific object in view in so doing. To collect eggs merely to satisfy one's æsthetic sense of the beautiful, or to acquire something which someone else has not got, is admittedly not sufficient excuse for causing suffering, however slight that may be, to any bird. On the other hand, it is now generally agreed that the study of eggs and the breeding of birds is of some advantage to Ornithology and, if properly conducted, is no more cruel than bird-photography or any other method of studying bird-life. A very well-known watcher in England once said that he would rather have ten egg-collectors on his ground than one photographer, yet this has certainly, and rightly, not deterred bird-photographers from continuing their fascinating and useful hobby, nor should the widespread and often uncontrolled abuse of egg-collectors deter them from carrying on their particular line of investigation.

In India there are very few places where egg-collecting can do any harm. In a country so vast, and with so many natural difficulties to overcome, the percentage of eggs taken to those laid cannot be anything but infinitesimal, while natural enemies and natural causes certainly destroy many hundreds of eggs to every one taken by egg-collectors. Vermin swarm everywhere, and snakes, lizards, rapacious birds and great numbers of the cat tribe one and all take toll of eggs and young, while cyclones, floods etc. wipe out vast colonies of many species of birds in a few hours,

I would also like once more to emphasize what I have already said in regard to the methods employed in egg-collecting. Self-taken eggs are worth more than those taken by others, however good these may be, for it is generally possible to furnish fuller and more minute details concerning the nests, eggs and their environment. Eggs taken by small boys and casual collectors are worthless and should never be accepted other than in very exceptional circumstances. At the same time, assertions, such as are sometimes made, that all eggs taken by local Indian villagers etc. are worthless are, of course, utterly incorrect, as some of these same villagers are wonderful field-naturalists, highly intelligent and capable of being trained to do excellent work. No one man can cover so wide an area as the whole of India, Burma and Ceylon, yet a comparison between the Oology of these various regions is essential before general conclusions can be drawn. The author has been so fortunate as to obtain from many naturalists collections the cream from which has been incorporated with his own, thus making it truly representative of areas which it would have been impossible for him to work personally. Among these collections may be mentioned those of Osmaston and Ward from Kashmir and the unique material obtained by the former in the Andamans and many other places; the collections of P. Dodsworth and A. E. Jones from the Simla States; Rattray's from Kashmir, the Murree Hills etc.; Whympers from Kuman; Tunnard's and Phillips's from Ceylon; Betham's from many districts in the West and North-West; Pitman's and Whitehead's from the North-West Frontier; most of Bulkley's collections made in Sind; Mackinnon's from Mussoorie, Howard Campbell's from the Nilgiris; Stuart's and Bourdillon's from Travancore; Coltart's from Bihar; Hopwood's, Mackenzie's, Grant's, part of Harington's and several other smaller collections from Burma, including Livesey's, principally obtained in the Shan States. In addition to these complete or part collections, many other field-naturalists whose names constantly appear in the pages of this work have given me of their best, and to them—too many to name individually—I owe a great debt of gratitude for all they have done to help me in amassing material sufficient to enable me to complete a work of the nature of the present four volumes. They contain the result of nearly sixty years' field-work by the author as boy, young man and old man, together with that of nearly all the best collectors in India for the last fifty years and, if they assist those of the

present day and make their work any more easy, they have done enough to justify themselves. If, also, it enables my readers to carry on their work in a systematic method, adding to our knowledge where it is most needed, showing them to some extent how, when, where and why to work, then the volumes are not only justified, but their author's object is attained.

Among those to whom my thanks are due for help I must mention both Colonel R. H. Rattray and Captain R. S. P. Bates, who have supplied me with the great majority of the photographs which illustrate the work. In some cases when I have had to collate and summarize the information contained in numerous notes and letters, the authors have been good enough to read and check results so as to ensure their correctness and, among these, I would especially mention the names of Colonel Rattray, General Betham, and Messrs. B. B. Osmaston, J. Stuart and Chas. M. Inglis.

The Bibliography has been given in 'The Fauna' and I have not repeated it again for this work.

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1st June, 1935.

LIST OF PLATES.

(From photographs by T. R. Livesey and
Captain R. S. P. Bates.)

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THE NIDIFICATION OF BIRDS OF THE INDIAN EMPIRE.

Order III. ACCIPITRES.

(DIURNAL BIRDS OF PREY.)

Family PANDIONIDÆ.

(OSPREYS.)

Pandion haliaëtus.

THE OSPREY.

(1704) *Pandion haliaëtus haliaëtus* (Linn.).

THE EUROPEAN OSPREY.

Pandion haliaëtus haliaëtus, Fauna B. I., Birds, 2nd ed. vol. v, p. 3.

The Osprey has a very wide breeding range over almost the whole of Europe and Northern Asia, nesting as far South as the Himalayas and occasionally even in the plains adjacent to them. Livesey has seen Ospreys in pairs fishing on the Inli Lake, in the Southern Shan States, in May and June, and it is practically certain that they must breed somewhere in the vicinity.

Although this fine bird occurs regularly in the Summer in the Himalayas very little is on record about its breeding in these mountains. Parker took a single egg from a nest in the Botanical Gardens in Calcutta but, although the egg eventually came into my possession, there were no details with it, though the egg is, of course, unmistakable. In Cachar a pair bred for many years on some high ground in the centre of the Chutla bheel, a vast swamp covering a huge area in the Rains and almost drying up in the months of March and April. This nest, from which I obtained three eggs on the 14th April, was a huge affair of sticks

and branches measuring about $4\frac{1}{2}$ feet across and nearly the same in depth. It was built about 40 feet up in a thinly foliated tree and was conspicuous for miles around. There was no lining beyond rather smaller twigs and leaves and one filthy piece of wool. The villagers said that these birds had bred there for at least 40 years, and they continued to breed for two years more, when one of the birds, a grand female, was unfortunately shot by a planter when out Snipe-shooting. I have been told of a nest said to have been found in the Sunderbands but cannot guarantee that the identification was correct.

In Turkestan Ludlow speaks of the bird as very common. He writes (Ibis, 1933, p. 689) that he saw six nests, four containing young, one three eggs, while the sixth was not examined. This was on the 19th May and at the junction of the Mointa and Tekkes Rivers.

In Europe they lay from about the end of April to the end of May in the Southern parts of their range and from the end of May to the middle of June in the more Northern. I obtained quite fresh eggs on the 23rd June in Northern Lapland, while D. Meinertzhagen took one pair in the South of that country on the 30th April.

Jourdain gives the measurements of one hundred European eggs as follows:—Average 61.6×46.3 mm.; maxima 69.0×46.0 and 68.4×50.3 mm.; minima 50.4×41.3 and 55.2×40.2 mm.

My Cachar eggs measure 61.1×46.0 , 62.0×45.2 and 61.0×46.8 mm.

The eggs are certainly among the most beautiful of all *Raptores*' eggs and vary very greatly *inter se*. Most eggs have a white, buffy white or creamy white ground, very boldly blotched and splashed with primary markings of chestnut-red, deep red, or red-brown. Under these are numerous secondary markings of lavender-grey, inky purple or livid grey. In many eggs the secondary markings suffice to give a very purple tint to the whole egg, while in a few they preponderate and are mingled with reddish mottlings obscuring almost the entire ground. Nearly always the blotches are larger and more thickly laid on at the larger end and I have one or two eggs in which they are practically confined to that end. A few eggs are more like huge eggs of the Peregrine, the whole surface freely covered with bright chestnut-red but, as a rule, only one egg in a clutch is so marked. One egg of a pair taken by Wolley has the ground pale brick-pink smudged with dull pale greyish brick-red, the other being a normally marked handsome egg. A clutch of three taken by Baron Carpelan in Lapland has one egg like an extremely handsome egg of a Peregrine, one with a pink ground mottled with purple, red and grey, and the third with a cream ground very richly mottled with deep red. A pair taken by myself in Lapland has the ground a rose-pink, but this, I believe, is very rare.

Family ÆGYPIIDÆ.

(OLD WORLD VULTURES.)

(1705) *Ægyptius monachus* (Linn.).

THE CINEREOUS VULTURE.

Ægyptius monachus, Fauna B. I., Birds, 2nd ed. vol. v, p. 7.

The breeding range of this fine Vulture extends from South-West Europe and Northern Africa, East through Western and Central Asia to India and Burma, whilst it has also been recorded from Ningpo in China. Livesey, who knows the bird well, tells me that he saw it at least twice at Bhamo and again at Namkham in December 1931.

In India little has been recorded about its nidification beyond the excellent notes of Marshall and Williamson from Quetta.

I found it breeding in North Cachar, a single pair which had occupied for many years a ledge on a cliff at about 6,000 feet on the Barail Range. Here they had built a huge stick-nest on a ledge on a narrow bare space where there had been a small landslide; on either side there was comparatively dense though rather stunted forest, trees jutting out from the face of the cliff wherever there was room between the boulders, so that it was not difficult to approach. On the 18th January the nest contained one egg, a very dingy dirty specimen and small, just like a *Pseudogyps* egg, so I had to shoot one of the parents for identification, which proved to be the female. The next year on revisiting the spot I found the nest again occupied, the male having found another mate. The nest was mainly of sticks and branches but mixed with all sorts of rubbish. All round was a great accumulation of very evil-smelling animal remnants. The ledge was about 12 feet long by 3 to 6 wide and the whole was more or less taken up with the nest. The Nagas of a village quite close by and within sight of the nest said it had been occupied for some fourteen or fifteen years.

Marshall has the following interesting note on its breeding near Quetta (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 264, 1911):—

"This year, hearing from a Pathan that he knew of a nest, I made arrangements to go out and see it on April 16th. I drove about 14 miles to the end of the road and then took to the hills walking; after about three hours walking up and down hill, we reached the tree on which the nest was placed; this was on an old juniper about 40 feet high and 7 feet through at the foot, and was situated on the steep hill-side about 8,000 feet above sea-level; it was in

a very wild place with high cliffs and steep slopes all round it. The nest itself was placed right at the top of the tree, so that the bird sitting on it was visible from a long way off. I climbed up the tree with some difficulty and when I got to the nest I found to my disgust that there was a young bird in it about one week old.

"The nest was an enormous mass of sticks and was lined with smaller sticks and strips of juniper bark with a few feathers; the materials of the nest would have filled a large cart, the measurements being approximately 3 feet thick at least and 7 feet across the top, the latter almost flat.

"One of the Pathans who was with me said he knew of a Lämmergeyer's nest, and I sent him and another man to see if there was any chance of getting to it. When I met them I found that on the way they had seen another nest of the Cinereous Vulture, also on a juniper tree, placed in an extremely awkward position, half up a cliff, and brought me one egg from it.

"Not long after the foregoing account was written, at the beginning of May, I was out on a shooting trip on the same hill, and found two more nests of this Vulture, both situated in similar positions to that described, at the extreme top of large juniper trees growing on the hillside, about 8,500 feet above the sea; the first nest had an egg in it but so hard set I could hear the bird chirping inside it; the other had a young bird in it, about 10 days old."

In the following years Marahall took other eggs, all found in nests similar in description and position to those described by him, and in 1913 Lieut.-Col. H. Delmé Radcliffe took an egg from a nest in the same Urak Valley, but at about 10,500 feet, on March 31st. At this time of the year he found snow lying a foot deep wherever the ground was flat enough for snow to lie (*ibid.* vol. xxii, p. 394, 1913).

In 1925 and following years Major C. H. Williams obtained several eggs of this species in the hills above Quetta. He writes (*ibid.* vol. xxxiii, p. 608, 1926):—"Three nests of this species were found this season (1925), all on Juniper trees growing in a deep gorge of the Takatu Range. Of these one nest was comparatively easy to get at but the others most difficult.

"The second nest was located after we had climbed the summit of Takatu, 11,375 feet, and were working along the ridge which separates Marachak Reserve from Burra Marachak, which is a very steep valley with almost perpendicular sides of crumbling limestone and volcanic rock.

"The nest was about 2,000 feet from the bottom, and the climb down was the worst I have ever attempted, but at last we managed to get down to it.

"On climbing the tree and searching the nest I could just touch the egg as I stood with my feet at the base of the nest, and eventually I had to climb on to the nest itself to secure the egg.

"The nest was a huge structure of sticks, huilt and added to for many years, and mixed with rags and skin; it was filthy and had a most offensive smell. In size it measured more than six feet from the base to the top and about five feet in diameter. The nest proper was a platform and the egg was laid on some grass."

The breeding season seems to be generally in March and early April. The earliest record is an egg taken in Bhutan between the 20th and 30th December, and then the one taken by myself on the 18th January in North Cachar. The latest record is 5th May for an egg almost hatching.

The eggs are often extremely handsome, but they vary from pure white, quite unmarked, to white, pale buff, creamy white or creamy buff well and richly marked with deep red, red-brown or purplish-brown. I have seen a few eggs as richly and as densely marked as the eggs of the Peregrine Falcon group, and others pure white flecked all over with small blotches of lavender-grey, the markings standing up boldly in spite of their pale colour. A very beautiful egg taken by Williams has the ground an almost rosy cream, tinged with buff, the whole surface speckled, spotted and blotched with lilac-red and pale brick-red. Another taken by Marshall has the ground white with great blotches of rich deep red-brown, more numerous at the larger end where they run into one another.

In shape the eggs vary considerably, but most are broad ovals, the smaller end very little compressed. The texture is coarse and the surface much pitted and often with tiny corrugations, but neither these nor the pits are so strongly represented as they are in some Vultures' eggs; in one or two eggs there is a faint gloss.

Eighteen eggs taken in India and Turkestan average 90.6×69.5 mm.: maxima 96.0×72.3 and 95.1×73.3 mm.; minima 85.1×56.2 mm.

(1706) *Sarcogyps calvus* (Scop.).

THE BLACK, or PONDICHERY, VULTURE.

Sarcogyps calvus, Fauna B. I., Birds, 2nd ed. vol. v, p. 9.

The Black Vulture is found over the whole of India and Burma, East into Siam and Cochin China and South in the Malay States. It is not found in Ceylon.

This Vulture is purely a tree-builder, but the tree may be anything from a scrubby bush to a tree a hundred feet high, and in the same way the country may be anything from cultivated country, open plains with scattered bushes, cacti and a few trees to actual forest. Nowhere does it breed on cliffs, rocks or buildings, even where these to human eyes seem to be much more suitable. Thus Feilden writes (Hume's 'Nests and Eggs,' vol. iii, p. 209):—"At Bellary in the Dekhan, where there were no trees except in and

about villages; the King Vulture used to breed on bushes from 6 to 10 feet high, a species of cactus or *euphorbia*, the only plants common on the dry rocks in that part of the country. It appears to me that if these birds ever build on rocks, it would be in so rocky and treeless a place as Bellary." Anderson also says of this bird in Kuman (*ibid.* p. 211):—"Although the country round about contained numerous eligible sites for a nest in a rocky situation, these Vultures seem to prefer a tree on the hill-side." Sometimes, even where big trees are available the birds do not use them. Davidson remarks that on one occasion he found a "nest which was placed on a low prickly bush, about 3 feet from the ground. The choice of the situation for the nest seems strange as within half a mile there were plenty of large trees, banyan, pekul and tamarind." Other nests of this bird found by Davidson in the vicinity were all on high trees, one indeed "on the very top of the highest tree in a small group, a banyan."

In Eastern India and Burma also trees seem to be the only choice made by the Black Vultures as sites for nests; in Bengal and Assam I have seen many scores and never one on anything but a tree and generally on a big one at some height from the ground. Where there are no big trees or only a few here and there the birds have, perforce, to use smaller ones. About Hansie, for instance, Blowitt says that they breed in low trees often; of seven nests two were at 14 feet from the ground and none over 25 feet.

His notes on the size of the nest are also of interest: "The nests varied from 19 to 25 inches in diameter and from 5 to 8 inches in thickness." Again, he describes another nest as 16 inches in diameter by 6 inches in depth.

Quite possibly the small size of this nest was merely due to the fact that the trees would not have supported greater weight. Normally the nests are very big, probably those I have seen averaged about 4 feet in diameter and anything from 2 to 4 feet deep according to the number of years they had been occupied. A nest built about 30 feet up in a Mango-tree in my garden was about 5 feet across, at least 4 feet deep, having evidently been occupied for many years, as the nest was built in regular layers. It was made of sticks, branches and leaves but, intermixed with these, were all sorts of oddments, rags, bits of skins, wool etc., though, in this instance, not very offensive. Except for its want of evil smell this was a quite typical nest such as is usually made by this Vulture. Occasionally it will use nests of other Vultures or of Fishing-Eagles, for I have two or three times seen this happen, once the Black Vultures actually driving away a pair of *Pseudogyps* from their newly made nest, though the latter put up a fair fight before giving in.

These birds never breed in company and I have never seen a nest within a hundred yards of another; at the same time the pair referred to above as breeding in my garden selected a tree in

which there were already two occupied nests of White-backed Vultures.

The breeding season varies. In Western and Southern India most birds lay in February and March, much later than other Vultures; sometimes, however, they lay earlier. Hume found an egg laid in November, Bingham took three eggs on the 24th October at Allahabad; at Poona Betham obtained fresh eggs in January, February and March, while, on the other hand, in Kuman at 5,000 feet Anderson found the birds still building on the 13th May.

In Eastern India and Burma the usual months for laying are December and January, though a fair number also breed in February and early March.

Only one egg is laid, never two and, in practically every case, it is pure white when first laid, though it soon becomes sullied and dirty. Rarely an egg is faintly flecked with blotches of light reddish. I have never taken a well-marked egg myself but an egg taken by Howard Campbell at Kodaikanal and now in my collection is comparatively well blotched with light reddish-brown over the whole surface. This was the only egg of the species Campbell ever took.

Sixty eggs average 83.9×66.0 mm.: maxima 89.5×65.3 and $? \times 71.1$ mm. (Hume); minima 79.5×64.5 and 79.6×61.5 mm.

In shape the eggs are broader ovals than those of most Vultures and the texture is rather finer, the surface smoother and rarely with a faint gloss.

Both birds incubate. A nest built in a Mango-tree about 20 yards from my bedroom window in Dacca was invariably occupied by the male in the mornings and evenings and by the female during most of the day. Dawn was always greeted by the extraordinary roaring notes indulged in by both sexes *in copula*; after this the male settled on the nest and the female flew away to scavenge, returning in a couple of hours. She then enticed the male to further copulation and took her turn on the nest.

Rarely the birds do, as Hume suggested, copulate during flight, as I have twice seen the act carried out under these circumstances with the usual roaring. The birds were flying at a great height, sailing round and round, twisting under and above each other, and then suddenly meeting and falling rapidly as the act was completed.

I believe incubation takes forty-five days, but am not quite sure, as I was absent when the egg was laid which I watched. Two days before it hatched I examined the egg and, even then, the chick was capable of uttering loud croaks and wheezes. The parent birds took no notice of the egg being removed, nor have I ever seen them attempt to protect nest, eggs or young.

Gyps fulvus (Hablizl.).**THE GRIFFON VULTURE.**(1707) **Gyps fulvus fulvescens Hume.****THE INDIAN GRIFFON VULTURE.***Gyps fulvus fulvescens*, Fauna B. I., Birds, 2nd ed. vol. v, p. 11.

The Indian Griffon, according to Hume, breeds "all over the drier and more desert portions of Sindh, Rajputana, the Punjab, the North-West and Central Provinces." It has occurred and is probably resident as far South as Khandesh on the West and, on the East, is very common at Jamalpur in Bihar. Further East I have seen it in Assam, but I do not think it breeds there, whilst Blanford has recorded it from the Godavery near Duma-gudem, where also it is probably a rare straggler.

The only accounts of this bird's breeding in Hume's 'Nests and Eggs' are those given by Thompson, Marshall and Bingham, who all describe the nests as huge affairs of sticks and branches built in every case on large Peepul-trees standing alone in open plains or in cultivated land.

Since then all records refer to this Vulture as breeding on cliffs. Ward, in his notes on the birds of Kashmir, writes of it under the name of *fulvus* as common in the higher elevations and breeding on cliffs, while in a letter to me he adds the following notes on some eggs he sent me in 1908 :—"Those birds, *fulvescens*, are common in places on the lower hills of Kashmir, breeding on ledges on cliffs in small or medium-sized colonies. The above eggs (4) with 10 others were all taken from the same colony which was visited daily on and after the 23rd of March and the eggs taken as laid. None are coloured, though some are stained with vegetable rubbish, especially those taken on the 23rd, which had been laid some days previously, and that on the 31st, which had probably been overlooked in our earlier visits. The nests were poor affairs, badly and clumsily built of sticks and rubbish and very verminous; some were in small groups together and others single and wide apart from the rest."

Ollenbach found them breeding near Jamalpore and sent me a very beautiful series of eggs together with the following account :—"They were all taken from a colony of about a dozen pairs breeding on ledges of the mud-cliffs in the Kharakpore hills near Monghyr. The nests were made of sticks and various rubbish, lined with green branches to which the leaves were still attached. In size the nests varied greatly, probably according to their age, as the birds returned to the same nest year after year unless they were blown away in the monsoon; in this case new nests were built on the old sites or close to them. These were often very meagre, the egg resting on a few handfuls of sticks and rubbish, while the

old nests might measure four feet long and two or three deep, the breadth depending on the width of the ledge upon which the were constructed. I have never seen more than one egg but, if this is taken, the birds lay again and bring up the young one. Many remains of animals etc. are to be found both on the ledges and on the ground below the cliff, and the place is often very smelly, the nests and ledges being full of vermin."

There is little one can add to these accounts. Gill gives a very similar description of colonies found by him in Oudh.

In Jamalpore and in the plains generally this Vulture breeds in November and December, though occasionally as late as February, but in Kashmir the normal breeding season is from the end of February to the first week in April.

Only one egg is laid, which is generally white but is occasionally flecked with red and rarely fairly well blotched or spotted with the same. One egg taken by Ollenbach is quite well spotted with dark brown at the larger end, while a second has very faint streaks and scrawls of very pale reddish.

Twenty-five eggs average 90.7×70.2 mm.: maxima 97.0×72.0 and 95.0×73.0 mm.; minima 83.8×65.0 mm.

The texture, for so large an egg, is fairly smooth and fine but very strong. Occasionally the surface is granulated or pitted but not very strongly.

I have no details as to incubation, but both sexes help in making the nest, a feature common to all Vultures, the males bringing the materials which the females sort out and place in position.

(1709) *Gyps himalayensis* Hume.

THE HIMALAYAN GRIFFON VULTURE.

Gyps himalayensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 13.

This Griffon is found throughout the Himalayas from Afghanistan to Tibet and Western Assam. North of this it is a resident breeding bird in Turkestan. It breeds most commonly between 4,000 and 8,000 feet, occurring up to 14,000 feet in Tibet and to 10,000 feet in Gilgit.

This species is entirely a cliff builder, sometimes selecting unapproachable sites on ledges on sheer precipices, unclimbable and with overhanging crests, at other times places which can be climbed with or without the aid of ropes and, sometimes, on ledges on sloping cliffs on sites which can be got at with little difficulty and no danger. They breed in colonies, usually quite small, while Hume notes that six nests is the most he has seen together. Skinner, however, found a dozen pairs in a colony on Parachinar, Ward mentions colonies of a dozen or more nests in Kashmir, while Dodsworth sent me some eggs from a colony which he considered to have contained fifty or sixty pairs. Even when the colonies are larger

than usual the nests may be considerably scattered and only two or three close together on any one ledge.

Dodsworth described to me a small colony of about a dozen pairs found by him in the Keonthal State as follows:—"These Vultures are very common in this State between 5,000 and 9,000 feet. The eggs I send you were all laid in nests which were built on ledges of the cliff's face but were got at without difficulty and without having to use ropes etc. In some cases the nests were bulky structures of sticks and branches, well lined with smaller ones, others were comparatively small, whilst in one or two cases the eggs were laid directly on the bare earth, resting on the débris and dust collected on the ledges. The birds must have used this cliff for many generations as the whole face was whitened with their droppings and below, at the base, was an indescribable litter of remains of bones, skins etc."

Generally the ledges selected are such as are fairly well protected from rain and wind by overhanging rocks, and Cock says that "in all cases there is a shelter for the young by some overhanging ledge."

Hume notes that they sometimes usurp the nests of Eagles and other birds, while Cock records "a nest that I was watching, belonging to *Gypætus barbatus*, was taken possession of by a pair of *G. himalayensis*; they commenced by throwing out the wool that had been placed in the nest, and for some days at least one Vulture might always be seen on the nest and occasionally both. I often saw the Lämmergeyer try to effect a lodgment on the nest, but the Vulture on sentry had, only to come to the front to drive the Lämmergeyer off."

As regards the breeding season Hume writes that they lay during the last week in December to the first week in March; most birds certainly lay in January and early February, but Ward took many nests in March and April, while I have one egg taken in Tibet on the 9th May. This may, however, have been a second egg laid, for the colony had been previously raided, or it may have been an addled egg, as the other nests contained young birds.

As usual with the bigger Vultures only one egg is laid. Of two out of three eggs the surface is unspotted, or nearly unspotted, white, while the third is more or less faintly blotched or speckled with light reddish. One very handsome egg collected by Dodsworth is well spotted all over with rather bright reddish-brown. Hume, however, remarks, and is confirmed by some specimens in his collection, that "fully two-thirds are more or less blotched or streaked with lighter or duller shades of red-brown, or with pale brown or olive-brown, perhaps one in ten are blotched all over, and two in ten have a considerable amount of markings, confluent at one or other end."

The texture is coarser than in the eggs of other species of *Gyps*

and in shape they are proportionately longer. The inside membrane of the egg is a dark bright green in all eggs of *Gyps*.

Fifty eggs, including those in Hume's collection, average 94.8×70.1 mm.; maxima 103.0×71.8 and 94.7×74.0 mm.; minima 89.2×68.9 and 90.6×65.0 mm.

Gyps indicus.

THE LONG-BILLED VULTURE.

(1710) *Gyps indicus indicus* (Scop.).

THE INDIAN LONG-BILLED VULTURE.

Gyps indicus indicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 16.

This race of the Long-billed Vulture is found over the whole of Southern and Central India South of the Indo-Gangetic plain with the exception of Sind and Ceylon. It is also probable that the race in the angle of the Beas and the Ganges some way South is *nudiceps* and not true *indicus*.

Parker's notes recorded in Hume's 'Nests and Eggs' (p. 202) and those of Mathews (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 287, 1918) refer to *nudiceps* and not to this form.

In my collection I have eggs from Khandesh (Davidson); Shevaroy Hills (Packard); Ooty, Nilgiris (Cardew and Campbell); Baroda and Poona (Betham) and Gya (Field), all of which were taken from nests built on ledges of cliffs, and in no single instance from a nest on a tree. The descriptions given of the colonies and sites all agree with one another; the former are said to be usually small, two or three to a dozen pairs as a rule, and in only one instance has the colony been of more than this size, while often a nest may be seen quite by itself. The sites selected are ledges of cliff-faces, rocks on shelving hill-slopes or, more often than anywhere else, on the great outcrops of rock which rise from the grass-covered hill-sides of the Southern ranges. One colony found by Packard on the Shevaroy Hills was breeding on a mass of great rocks rising some 60 feet or so from the surrounding grassland, here and there smaller outcrops showing up in all directions. All the nests, eight in number, were on the big rock with the exception of one nest on the summit of a smaller rock close by. The nests were in some cases more or less protected by an overhanging rock, but in others absolutely exposed to sun, rain and wind. The nests were, for Vultures' nests, rather small, running between 2 and 3 feet across and not more than 6 inches to a foot deep, while one or two consisted of a few sticks and tufts of coarse grass hardly keeping the egg off the bare earth. The great blaze of white on these cliffs showed that the crags had long been occupied hnt, probably, the nests were frequently destroyed in storms and so did not attain the immense size of some nests of other species.

Another colony of only six pairs was breeding on the same hills on ledges and boulders on a steep cliff-side.

The above descriptions would suffice for the breeding haunts of all the colonies from which I have received eggs, though in a few instances the nests seem to have been more bulky.

None of my correspondents speak of any real lining to the nests, though some refer to their dirty and verminous condition.

One colony, unlike all the above, is described by Hume (vol. iii, p. 203) as being of great dimensions, his graphic description containing so many details of interest that I quote it here:—"The Taragurh Hill, which overlooks and almost overhangs the city of Ajmere and the beautiful Ana Sagur Lake, may be about 2,900 feet above the level of the sea. On the precipitous faces of this hill, especially where succeeding overlapping ledges make the place as nearly inaccessible as may be, colonies of this Vulture breed. One of these breeding haunts was a cliff-face some 100 feet high, by 300 wide, all broken up into irregular ledges of which the highest overhung all the rest. All the ledges hut the uppermost, when looked at from below, seemed garnished with white fringes, the white droppings of the birds. Seen from a distance the whole cliff-face seemed mottled with huge patches of whitewash. Bleached bones and dusky quills strewed every little plateau and nestled in every cranny. It was on the 30th March, 1867, that I laid siege to this natural fortress. I crept to the lowest ledge, a work of extreme difficulty, owing to the slipperiness of the white-crusts rocks. To my intense disgust, a little apart from the rest sat a huge unwieldy mass of yellow fluffy down, opening a vast mouth and hissing or cackling at me in the most hostile manner. Everywhere we found the nests empty; but in the case of about half the number a more or less advanced young one was squatting on the bare rock close to the nest. Of all the 50 nests to which I made my way not one contained more than a single young one. Captain Repton very kindly secured for me a noble series of eggs from these very nests ten months later."

The breeding season is everywhere principally in December and January, but I have seen eggs taken as early as the 16th November (Baroda) and as late as the 3rd March (Nilgiris).

Like the other true Vultures this bird also lays but a single egg, generally white but frequently spotted, blotched or freckled to a greater or less degree with light reddish or reddish-brown, and I have seen one or two eggs which might almost be termed handsome.

Twenty eggs average 88.6×67.3 mm.: maxima 91.5×68.5 and 84.6×68.6 mm.; minima 81.6×64.2 mm.

There appears to be nothing noted as to which sex makes the nest and incubates the egg, nor is there anything known as to the period of incubation.

(1711) *Gyps indicus nudiceps* Stuart Baker.

THE NORTHERN LONG-BILLED VULTURE.

Gyps indicus nudiceps, Fauna B. I., Birds, 2nd ed. vol. v, p. 17.

This Vulture takes the place of the preceding bird in the Indo-Gangetic plain. It occurs all along the lower ranges of the Himalayas from Kashmir to Eastern Assam and in the plains to their South as far as the rivers named and also in the Northern triangle at the upper regions of the two. It is very common in Eastern Bengal and Assam, occurs in Burma, and is said to extend into the Malay States.

Jones records its breeding at Ambala (Journ. Bomb. Nat. Hist. Soc. vol. xxiv, p. 358, 1916) and Gill in the United Provinces near Benares (*ibid.* vol. xxvii, p. 951, 1921). Parker's description of the nesting of *G. indicus* given in Hume's 'Nests and Eggs' also refers to this bird.

I found many nests of this Vulture in Western Assam and in Eastern Bengal, where the birds were numerous enough to enable one to examine a dozen to twenty nests in a morning, the more so in that the birds often bred in colonies of half-a-dozen or more, although I never found more than one nest in a tree. The birds always selected large trees in which to build and seemed to prefer Mango-trees to any others, though I also found them in Peepuls and other kinds as well. In the Mikir Hills a colony of seven or eight pairs bred in a long clump of trees, the names of which I did not know, about a hundred yards wide by two hundred long. The nests were all 25 to 40 feet from the ground, but were all quite easy to get at with a little patience, and all held fresh eggs on the 16th and 17th January. Sometimes these Vultures make their nests on single great trees growing in the middle of a village, while one pair actually selected a huge Peepul standing in the very centre of the Chandpur Bazaar in the Sylhet District. They prefer the vicinity of human habitations, doubtless for scavenging purposes, though I have also found them breeding in open country well away from all signs of mankind. As a rule the nests are high up and sometimes quite at or near the tops of very lofty trees; occasionally, however, I have seen the nests at about 20 feet up in heavily foliated trees such as Banyans and various *Fici*.

The nests are like those of other Vultures but are, perhaps, smaller in proportion and very compactly built, being made of leafy branches which tangle closely in with one another. In most nests there is no real lining but in one nest I found the tattered remnants of a sheep's skin and in another there were a lot of rags.

Parker remarks also on the "compactness" of the nests of these Vultures in describing some he examined at Mogra in the 24th Parganas which were all built on great Cotton-trees, then leafless

and bare on 11th February. At this date there were young birds, but on the 20th January he secured two eggs.

Nests measured by myself were about 30 inches wide by about 15 to 20 inches deep, one extra large one being a little over 3 feet across. The birds return to the same nesting-site and, generally, to the same nest, for many years in succession.

The season for laying is from November to the end of February, but in Burma Macdonald took a much incubated egg in October.

As usual the eggs are often an unspotted white, though very often they are flecked and blotched with light reddish, while really well-marked eggs are by no means rare, and I have one or two which are quite richly marked at the larger end with numerous blotches of dark reddish-brown.

In shape the eggs vary from normal oval to a very broad oval but, as a series, they average longer in proportion than the eggs of *Pseudogyps*.

One hundred eggs average 84.7×63.6 mm.: maxima 91.8×65.4 and 78.8×68.3 mm.; minima 76.1×62.8 and 78.4×59.9 mm.

Both sexes assist in building the nest and in incubation.

(1712) *Gyps indicus jonesi* Whistler.

THE HIMALAYAN LONG-BILLED VULTURE.

Gyps indicus jonesi, Fauna B. I., Birds, 2nd ed. vol. v, p. 18.

The range of this bird is apparently the lower Himalayan hills in the Punjab at about 1,500 and 2,500 feet, in the area between the Salt Range and the Indus.

A. E. Jones discovered this bird in one of its breeding haunts in 1919 and then sent home a single specimen which, however, I felt could not be named until further material had been obtained. In 1927 Jones sent home more material to Whistler who, bolder than I, gave it a name. Its actual position is very uncertain. In 1919 Jones sent me home a series of eggs and thus described their breeding haunts:—"The eggs were taken from nests on a cliff, facing North, on a low range of hills, known as the 'Kala Chita Reserve.' All the nests were rather scanty, composed of twigs (with foliage still adhering to them) and a small quantity of dried grass, and measured 2 to $2\frac{1}{2}$ feet in diameter. The nests were 20 to 30 feet apart on separate and distinct ledges, but the whole cliff-face was whitewashed with their droppings and they had evidently occupied this breeding place for many years. On 24th February some eggs were fresh and in others incubation had commenced." In 1930 Jones sent me three more eggs from the same colony, taken on the 22nd January.

All the eggs are pure white and are, as might be expected, very large.

Seven eggs average 92.6×68.8 mm.: maxima 96.1×71.3 mm.; minima 87.0×69.0 and 87.2×65.9 mm.

(1713) *Pseudogyps bengalensis* (Gmelin).

THE INDIAN WHITE-BACKED VULTURE.

Pseudogyps bengalensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 19.

This, the most common of all our Indian Vultures, is found over the greater part of India and Burma, but does not occur in Ceylon. In Sind, parts of desert Rajputana and of the Punjab it is rare. It is also found in Siam and Indo-China and in parts of the Malay Peninsula.

As this bird lives almost entirely by scavenging it is naturally more common round towns and villages than elsewhere, but it also sometimes breeds hundreds of miles from any human habitation, though such nests may not number one in every thousand. They ascend the hills for two or perhaps even three thousand feet but not in great numbers and, when they breed in the hills, the nests are nearly always solitary, while in the plains they often breed close together and sometimes in large colonies.

Hume says: "I have seen as many as fifteen nests on one Peepul-tree, and as many as a hundred on a group of trees lying within a circle of 200 or 300 yards in diameter." In Sind Scrope Doig found a colony of about forty pairs breeding on some large Babool-trees growing in an island in the middle of a large swamp. Personally I have never found more than two or three nests on the same tree, though about a dozen pairs bred on some huge Mango-trees in our garden in Dacca and probably some fifty or more pairs bred within half a mile of the house. On one occasion in Dacca in early December two orderlies and I examined exactly fifty nests, and undoubtedly could have found more had we had time.

I think they breed invariably on trees and, where they are obtainable, on big trees. In Bengal and Assam Mango-trees are undoubtedly the favourites for building in. Hume, however, says: "Banyan and Peepul are their favourite trees, I think; but I have found them breeding on the neem, tamarind, arjun and others; in every case, however, on large trees."

Anderson considered the various *Fici* to be the favourite building trees, while in Bombay Davidson, Vidal and others found most nests in Mango- and Cotton-trees. No one has recorded their building on palms, yet I have seen dozens of nests built on various palms, principally coconut, in gardens in the outskirts of Calcutta and in many other places in the 24th Parganas. In such cases the nests rest right up on the crown of the palms and in high winds look very precarious. Nests built close to the ground are exceptional, but there was a nest for many years in quite a small Jackfruit-tree in the compound of the Circuit-House in Dacca which was certainly not more than 15 feet from the ground.

The nests vary considerably in size but, as they are often repaired and added to for several consecutive years, they sometimes attain

a great bulk. New nests are roughly about 2 feet in diameter by 6 or 8 inches deep, but I have seen old nests as much as 5 feet across by fully 4 in depth. Although they look as if very roughly and clumsily put together they stand a great deal of pulling about before they break up. Most of the material used consists of green branches torn off the trees with the leaves still attached; the twigs of these when interlaced become quite firmly locked, the dead and dry sticks pushed in among them adding further to their stability. Most nests have very shallow cavities for the eggs, often only a few inches deep, but sometimes the hollow may be a foot deep, while Hume mentions one "which was a regular deep cup, in which a moderately sized sheep might have been stowed away." There is nearly always a rough lining of green twigs and leaves, but these are not renewed during incubation and, often, all sorts of rubbish is mixed with the green leaves. I have seen wool, bits of skin, cloth etc. often made use of and scraps of indescribable filth. Many nests are very evil smelling, while others, equally old in appearance, are quite inoffensive.

The great majority of White-backed Vultures lay in November, December and early January, but I have taken eggs in the middle of October and others as late as the first week in March. These latter may be eggs replacing others which have been destroyed, for I have frequently found that this Vulture will lay again in the same nest if the first egg be taken when fresh. Butler also records that he took four fresh eggs from four nests on October 20th and that on the 8th November all four had laid again, while in two other nests from which he had taken much incubated eggs the females were sitting and would probably have laid later.

Only one egg is laid and, though Anderson once took three eggs from the same nest and once two, these were not the product of the same bird.

The eggs vary greatly; most are white or white faintly marked with pale red or pale yellowish-brown. Many are, however, quite well marked in various ways with reddish-brown, light red or grey-brown, while a few have secondary blotches of lavender-grey or pale inky-grey. The markings are rarely at all bold in character but, occasionally, even such as these are to be met with. I have one egg which has the whole larger end very handsomely mottled with brick-red and lavender; another densely speckled and spotted with brick-red over the whole surface and, yet a third, with large deep brown blotches scattered boldly at the larger end. Every type of egg may be seen between these extremes as well as eggs devoid of all marking.

One hundred eggs average 85.8×64.2 mm.: maxima 107.0×66.0 and 90.0×69.0 mm.; minima 80.5×64.0 and 83.0×61.0 mm. A tiny egg, measuring only 64.5×51.0 mm., had a chick fully formed in it, while I have seen other pigmy eggs which were fertile.

Both sexes build the nest, the male collecting material while the female puts it in position, and both male and female take part in incubation, which I believe takes forty-five days.

The female when incubating often sits very close, having sometimes to be literally pushed off the nest but I have never known her to show any fight, though she may sit on a branch a few feet away uttering croaks and hisses.

In copula and before the act both sexes indulge in tremendous roaring which, however, is not so loud as that of the Black Vulture. I have never seen copulation take place in the air, but the Eastern Bengal shikaries say that this does sometimes take place.

Neophron peronopterus.

THE EGYPTIAN SCAVENGER VULTURE.

(1714) *Neophron peronopterus peronopterus* (Linn.).

THE EGYPTIAN, OR LARGER WHITE, SCAVENGER VULTURE.

Neophron peronopterus peronopterus, Fauna B. I., Birds, 2nd ed. vol. v, p. 22.

The Vulture ranges from South-West Europe and the greater part of Africa through Egypt to Afghanistan, Baluchistan and Persia, entering Indian limits as far East as Delhi and as far South as Cutch, breeding up to an elevation of some 8,500 feet.

This Scavenger Vulture is a frequenter of towns and villages, breeding freely both in and round them as well as in all kinds of buildings and trees away from the actual towns. There is little one can add to Hume's summary of their nesting habits. He writes:—"They nest indifferently, it appears to me, on rocky precipices, earthen cliffs, parapets and cornices of buildings, and large trees. I have often found the nest on ledges of the clay-cliffs of the Jumna, close to nests containing the young of Bonelli's Eagle or the Jugger Falcon. At Etawah a pair built yearly on the church-tower, at the base of the steeple. One pair always breeds on the portico of the Metcalfe Hall at Agra. On the rocky headland, known as the Mata Pahar, which juts out from the Southern shore of the Sambhur Lake, whose blue waters it overlooks, I found a nest in the cleft of a rock, from which I was able to take the eggs without leaving the pathway; and within 2 feet of the head of the sitting bird was a nest containing three eggs of *Ptyonoprogne concolor*. They are far from seeking retirement. They build commonly on trees in the suburbs of towns—neem, tamarind, peepul and bnrkot alike furnishing them with homesteads; and for several years I noticed a pair building on a comparatively small tree in the centre of the busy grain-market of Etawah.

"The nests are clumsy, ragged, stick structures; platforms slightly depressed towards the centre, loosely put together and lined with any soft substance they can most readily meet with. Old rags are a great stand-by. In many parts of the country, wayfarers, as they pass particular trees, have a semi-religious custom of tearing a strip off their clothes to hang thereon. These are a perfect godsend to the Neophrons of the neighbourhood, whom I have more than once watched robbing these rural 'shrines' of their trophies by the score. Sometimes the rags of various colours are laid out neatly in the nest, as if an attempt had been made to please the eye; sometimes they are irregularly jumbled up in the materials of the nest. Cotton-wool, old and dirty, stolen, I suspect, from the old 'rizais' or padded coverlids thrown with half-burnt dead bodies into the river, occurs occasionally in great lumps in the nest, and I have sometimes found nests lined entirely with masses of human hair. Sometimes they line their nests with green leaves. In size the nests vary from 2 to 3 feet in diameter, and from 4 to 10 inches in depth."

In Sind Scrope Doig found them usually breeding in pollarded Kundy-trees, but Eateq has also sent me a fine series of eggs all taken from ledges on the cliffs of the Poi Mangho hills.

They return annually to the same nesting site and to the same nest if still available, though these are generally scattered by winds and storms. Hume gives rather large measurements—*vide supra*—for the nests, but Blewitt records of the many nests seen by him that "they varied from 12 to 18 inches in diameter and from 3 to 7 inches in thickness." I have also been told of eggs laid on the bare earth of cliffs, on roofs of buildings and in great hollows between the first branching boughs of big trees.

They breed principally in March and April, but I have seen eggs taken below Simla up to 7,000 feet in the first week of May, while Marshall found a nest with eggs in the same month near Murree, where also Rattray took a single egg on the 11th May. Hume says that they commence to lay in February, and Bingham also records it as breeding commonly at Delhi in February and March.

The eggs are nearly always two in number, very rarely three but occasionally one only.

In shape they are normally rather broad ovals very little compressed at the smaller end; rarely they are long or pointed ovals and occasionally almost spheroidal. The texture is very coarse, less compact, or "indurated" as Hume calls it, and the surface, except in the very highly pigmented eggs, porous, rough and dull.

The range of variation in colour is enormous but, as a series, they are beautifully coloured, handsome eggs. They vary in ground from chalky white, pale creamy, pale dingy reddish to a rich warm cream or reddish. Some eggs are sparsely blotched or spotted with pale brick-red, deep red, dark brown or, rarely, purple-brown,

chiefly at the larger end. In other eggs the marks are very numerous and are distributed over the whole surface. Some eggs are freckled or stippled more or less freely with the same colours, many have the stippings fairly numerous at the larger end, while quite a number have them so plentiful and dark that the eggs look a uniform brick-red, dark reddish-brown or, rarely, purple-red. I have one egg with deep red ground with purple-red blotches and smears at the larger end, coloured just like a Honey-Buzzard's egg. Others are like eggs of Peregrines or of Kestrels and Sparrow-Hawks. When seen in very big series the eggs of this race taken in India are not quite so fine as those taken in Spain. On the other hand they are much more handsome than those of the Southern Indian race, *ginginianus*.

One hundred Indian eggs average 65.2×51.2 mm.: maxima 73.0×50.8 and 68.2×58.4 mm.; minima 53.7×43.0 mm.

Both sexes incubate and both assist in the building of the nest. The period of incubation is probably forty-two days, which is said to be the period taken by the Southern race.

(1715) *Neophron perenopterus ginginianus* (Lath.).

THE SMALLER WHITE SCAVENGER VULTURE.

Neophron perenopterus ginginianus, Fauna B. I., Birds, 2nd ed. vol. v, p. 23.

Excepting the area occupied by the preceding race in the North-West this Vulture is found over the whole of India from Cape Comorin to the Himalayas. It is only a straggler into Ceylon and does not occur in extreme Eastern Bengal or Assam, but is common in Chota Nagpur and Bihar. In the South of India it occurs in the Plains and in the hills up to 7,000 feet but it is not found in the Himalayas.

It is unnecessary to add anything in regard to its nesting habits to what has already been recorded about the larger race. The present bird makes the same kind of nest in the same situations and has exactly the same habits.

Dr. Coltart, when sending me some eggs, says they show rather well the types of situations these birds select. "One pair I took from a deserted nest of a Black Eagle (*Ictinaëtus*), another from the walls of an old indigo factory with practically no nest at all, a third from a large really well-built nest made in a Mango-tree, one of a large grove in which there were other nests, and the fourth from the crown of a palm-tree just outside my bungalow garden."

A curious site for this Vulture's nest is recorded by Major W. P. Paynter (Journ. Bomb. Nat. Hist. Soc. vol. xxx, p. 229, 1928), who found one on the ground at the foot of a tree in the Ganges Kadir containing a single egg.

Over most of their area these Vultures breed principally in March and April, but in Jamalpore Ollenbach found them breeding on the high mud-cliffs of Khorapore in April and early May.

In Belgaum Butler took numerous nests in February; Davidson and Wenden obtained eggs from the Deccan in February and March, while Vidal found two nests with young ones in January, so that in this last instance the eggs must have been laid the first week in December at latest. In Chota Nagpur I found eggs in May and the birds were still laying in June.

Two eggs only are laid, sometimes only one and very rarely three.

They cannot be distinguished from those of the Egyptian bird but, as a series, are very much more poorly marked, really handsome eggs being the exception rather than the rule; they are also much smaller.

One hundred eggs average 64.3×49.3 mm.: maxima 71.0×53.8 and 62.8×54.0 mm.; minima 57.7×46.0 and 68.3×41.6 mm.

Family FALCONIDÆ.

(EAGLES, FALCONS, HAWKS, etc.)

Subfamily GYPÆTINÆ.

(LÄMMERGEYERS.)

Gypætus barbatus (Linn.).

THE LÄMMERGEYER.

(1716) *Gypætus barbatus hemachalanus* Hutton.

THE HIMALAYAN BEARDED VULTURE, or LÄMMERGEYER.

Gypætus barbatus hemachalanus, Fauna B. I., Birds, 2nd ed. vol. v, p. 26.

This grand bird is found breeding from Afghanistan and Baluchistan through the outer Himalayas and the Punjab Salt Range to Bhutan. It breeds principally between about 4,500 up to 8,000 feet or exceptionally up to 10,000 feet, at which elevation Meinertzhagen found it near Quetta, where also Williams obtained eggs in the Marachak Valley at about the same elevation. Occasionally it breeds at comparatively low levels; in Kumaon Whympers took several nests at about 3,000 feet, while Jones actually took one pair of eggs at Jhalar, Campbellpur District, at 1,200 feet. On the other hand, birds have been recorded as breeding at far higher levels, though I believe all these refer really to *altaicus*.

Mr. P. Dodsworth when in Simla devoted two Cold Weathers to hunting down nests of this fine bird for me and, in addition to this, he had already had considerable experience of its nidification. In 1912 and 1913 he visited about thirty nests, and the following remarks include almost all that can be said about them :—

“ Practically all the eggs of the Lämmergeyer are laid between the 1st December and the 15th February, and when eggs are found later, as in March, I believe they are laid by birds whose first eggs have been robbed or whose nests have been destroyed by wind and weather, an accident of not uncommon occurrence as the nests are so often built in most exposed positions. They are always built on the faces of cliffs, being placed either on ledges, in caves or in deep crevices in the rocks. Sometimes, though this is certainly rare, they are built on ledges quite close to the tops of sloping cliffs, and I have seen more than one which I could walk down to without even having to use my hands for holding on. In one instance a wide ledge led from the top of the hill down some 40 or 50 feet, the grade so gentle and the ledge so firm and wide that we could saunter down to the nest at the far end and inspect it in the greatest comfort. This nest I should say was in a very wild part of the hills and not near any village. Most nests are built in places which are difficult of access without ropes and some of them almost or quite inaccessible, even with every artificial aid, while several of the nests I got for you could never have been reached without the aid of the fine ropes you sent out to me. One such nest was built on a narrow ledge on a tremendous cliff overhanging a gorge and, though it was not far from the top, it was overhung by another ledge wider than that upon which the nest rested. It was quite invisible from above, though we could locate the spot by noting where the parent birds went in. To add to our difficulties the top of the cliff was somewhat brittle and dry, so that to get a proper purchase for our ropes we had to drive in an iron bar some 20 feet or more from the edge. Making a loop round this, another man and I held on to the rope and gradually paid it out so that a third man could be gradually lowered over the edge. We had to pay out nearly 40 yards before the tug came to say he had arrived at the nest, but it must have been ten minutes before another tug told us to start hauling. Eventually the rope came back to us intact and the man's head appeared over the top, and soon we were in possession of our prize, a grand pair of fresh eggs. The man had, however, great difficulty in getting them. When he arrived level with the nest he found it was well out of reach, and it was only by swinging backwards and forwards that he eventually got a foothold on the ledge and was able to take the eggs. The great difficulty with many of the other nests we found was this fact of their being overhung by other ledges, a difficulty aggravated by crumbling rocks or earth, the latter causing us to give up one or two nests as hopeless.

"The nests we found varied almost as much as the situations in which they were placed. Some nests were huge, bulky affairs nearly filling the cave or crevice in which they were placed, or taking up some four or five feet of the ledge they were built on. In some of the biggest I estimated that there were a couple of cartloads of material. Other nests were very different; in some perhaps half a cartload of various articles were used, while in others there was nothing more than a few sticks and the eggs rested practically on the bare ground.

"The materials used were always the same; sticks and branches, sometimes almost as thick as one's wrist, sometimes little thicker than a pencil, formed the greater proportion of all. With these, however, were mixed coarse tufts of grass, rags, wool, bits of skins of all description and any other rubbish the birds could collect in the vicinity of the villages near them. Animal remains were present in many of them and, when built on ledges, the nests were sometimes surrounded by a great deal of such litter. The birds are awful cowards and never attack anybody and seldom make any demonstration of any kind, but it must be rather terrifying to a man sitting in a loop at the end of a long rope, many feet down a precipice, to have one of these huge birds sweep close past him.

"The eggs are either two or one, quite as often the latter as the former. Of this I am certain, as when one egg has been found, unless obviously incubated, it has always been left so that another could be laid if the birds intended to do so."

Dodsworth has never mentioned lining of any sort, but Cook says of one nest: "well lined with flocks of wool quite fresh"; and of another: "It was lined with locks of the hair of hill-goats"; while Jones says that he found one more or less lined with tufts of coarse grass.

Cook says also that all the nests are placed on cliffs facing East and South, but I have never been able to corroborate this. The same gentleman narrates how a nest which had been robbed was destroyed by the birds, who scattered the materials of which it was composed.

Everyone else agrees that the bird lays either one or two eggs, but Cook saw three in a nest, and Thompson remarks that "three may, not infrequently, be found."

In colour the eggs range from a pale creamy yellow or pale rusty orange to a deep reddish-buff. Many eggs appear to be uncoloured, the stippling being so fine that it can hardly be noticed. Other eggs are fairly well marked. I have seen a few eggs which appear to be uniform deep brick-red, others similar but with large blotches of a still deeper red-brown; some appear to be mottled all over with a deeper shade of whatever colour the ground may be. One egg in my collection is white with dull pale blood-red longitudinal streaks covering the whole surface, the small end being all densely mottled with this colour. Some eggs have a very rusty

orange appearance, possibly due to the same iron stains which discolour the lower plumage of the parent birds. This rusty stain is more prevalent in eggs from Kuman and the Western Himalayas than those from Simla, in which it is exceptional. The eggs are *not* like those of the Neophrons in spite of what Hume says, for a series of the eggs of these birds are definitely blotched, while a series of Lämmergeyer's eggs give one the impression of far more uniform pigmentation.

In shape most eggs are broad ovals, but I have seen a few rather long ovals and one a pointed oval. The texture is coarse but much harder and closer than in Vultures' eggs. The surface is generally smoother but occasionally rather pimply and corrugated, while any gloss is exceptional.

Sixty-three eggs average 85.0×67.4 mm.: maxima 91.5×70.0 and 87.0×72.0 mm.; minima 76.5×62.0 mm.

There appears to be nothing on record as regards period of incubation and as to what part the two sexes take in this or in nest-building.

(1717) *Gypaëtus barbatus altaicus* Sharpe.

THE ALTAI BEARDED VULTURE.

Gypaëtus barbatus altaicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 29.

This Central Asian Lämmergeyer is found from Turkestan to the Altai and Tianschan and South to Tibet. Hume records it as resident in the Lingzi Plateau, Ladak, at over 17,000 feet, and Osmaston also records Bearded Vultures in Ladak between 14,000 and 16,000 feet, whilst members of the Everest Expedition saw these birds soaring at an elevation of over 24,000 feet.

Nothing is recorded of its nidification. A pair of birds bred for some years in North Cachar whose pale coloration and large size—the wing of one bird was 890 mm.—seemed to point to their being of this race, though the elevation, not over 6,000 feet, was against it.

Macdonald obtained one egg for me in Tibet. This was said to have been taken from a huge nest consisting "of a pile of sticks and much rubbish built on a ledge near the top of a small cliff." Mr. Macdonald adds: "this was taken on the 29th February at about 14,000 feet on the cliffs above Gyantse Plain. I have not been able to get you any more, as the Tibetans will not climb these cliffs when there is still snow on them, and at this time there was snow everywhere."

The egg was quite fresh when taken but is a rather poorly marked one. The ground is a greyish-yellow and the whole surface is faintly stippled and mottled with grey and pale neutral tint. In shape it is the usual rather broad oval with a fairly smooth texture and without any of the corrugations often to be seen in the eggs of the preceding bird. It measures 85.0×65.0 mm.

Subfamily FALCONINÆ.

(EAGLES, FALCONS, etc.)

Falco peregrinus Tunstall.

THE PEREGRINE.

(1719) *Falco peregrinus peregrinator* Sund.

THE SHAHIN FALCON.

Falco peregrinus peregrinator, Fauna B. I., Birds, 2nd ed. vol. v, p. 34.

The breeding range of this beautiful Falcon extends from Afghanistan and Baluchistan to the Northern hills of Burma and to the Yangtse in China. It occurs over the whole of India as far South as Travancore and breeds wherever there are steep cliffs and gorges suitable as sites for the nest.

In Hume's 'Nests and Eggs' there is a record of a nest taken by Blewitt on the 25th January, near Raipur, containing one egg, under the name of "the Shaheen," while Cook records one under the name of *Falco atriceps* from Dharmasala in which he found two eggs on the 10th of March and a third on the 17th March. Jerdon also describes how it breeds on the Nilgiris, placing its nest on steep cliffs and precipices. Since these records were written many observers have taken eggs or young. I myself took many in North Cachar and the Khasia Hills; Dodsworth, Jones, Mackinnon and Whymper took nests in the Western Himalayas; Mackenzie obtained a nest with three eggs, almost pigmies, in the Chin Hills, while K. Macdonald and C. Hopwood also took eggs in other parts of Burma. In the Shan States Livesey failed to obtain eggs but found a nest with three young in the month of March.

My own experiences seem to cover all that can be said about their breeding habits, and I gave a very full account of them in 'The Ibis' (1917, pp. 224-235), too long to quote in the present work.

In the North Cachar Hills this Falcon was rare, the country being too heavily forested, though a few pairs bred on some of the cliffs and rocks over rivers and valleys. In the Khasia Hills several pairs bred on the Lilancote cliffs and the abrupt precipitous ridges facing the Sylhet Plains but towering some 3,000 to 4,000 feet above them. The nests were always built on very steep parts of the cliffs, resting either on ledges or in clefts in rocks, while each pair had two eyries, sometimes using one and sometimes the other. In most cases the two nests were far apart, half a mile or so, but in one case they were within a couple of hundred yards of each other. We found that if we took the eggs from one nest the birds generally then went to the other and laid a second clutch, which we never

interfered with. The first nest I ever took was obtained from a rather typical site. "Mahadeo" is a peak some 5,000 feet high overlooking the Mahor and Diyung Valleys. The summit is covered with stunted Oak, their branches twisted and distorted with the prevailing South wind but covered with dense streamers of vivid green moss and great bunches of many orchids, whose flaming flowers blazed out from among the green. Great rocks rose everywhere, some higher than the Oaks, but in between them grew the Oaks, with a scanty undergrowth of Begonias, Gloxinias, Jasmine and other plants. On one side the slopes of the Peak were climbable, though by no means easy, but on the other a sheer cliff of over 1,000 feet fell away almost straight down. Shrubs grew here and there where the soil had lodged in crevices, while on the bigger ledges small trees and bushes maintained a precarious hold. About 20 feet below the summit was a small ledge and under this two Shaheens kept darting in and out, showing that there was a nest there—a fact confirmed by my Naga friends, who said that the birds had bred there for some 14 or 15 years. The nest was inaccessible from above, but from below, at a point of some 40 feet from the nest, it looked as if a really good climber might do it. A Naga boy who had already shown a climbing ability little inferior to that of a cat, offered to try, but he had barely got half-a-dozen feet before he slipped and dislodged a stone which rumbled away into eternity below him. This was enough for me, and I ordered him back. The next day we returned with canes. One long cane was held by two or three men from above which we tied round the boy's waist, and then he was carried along the cliff-face till opposite the nest, which contained four grand eggs. These secured, we then hauled the boy back by a second cane we had tied to the other. The nest was built well under the ledge in a crevice in the rock and was a rather bulky affair entirely of sticks, some with the leaves attached, measuring about 18 inches across by about the same in depth.

While the Naga was being towed to the nest the two birds kept swooping at him, screaming the whole time, though never striking him. When the eggs were actually in the boy's hands they got more and more excited and swooped still closer, yet never touched him, though the female more than once came very near to striking him.

All the Shaheens' nests I have seen personally, eight in number, have been built, with one exception, in places inaccessible without the aid of ropes. Though not far below the top of the cliff, they were nearly always protected from above by an overhanging ledge, boulder or jutting clump of bushes. The one exception was built on the edge of a broad ledge sloping downwards from within 4 feet of the top of the cliff. The rocks were rather crumbling, but sturdy bushes grew in the face of the cliff and on the ledge itself, by the aid of which it was easy to scramble down to the nest.

The nests I have seen have all been made of sticks and branches, varying in size from that of a lead-pencil to others of about an inch in diameter. Some nests had no real lining beyond softer, more pliant twigs and leaves, but others had a considerable amount of wool, bits of skin, feathers etc. placed in the bottom of the receptacle for the eggs.

Dodsworth describes a nest taken by him as "a loose, irregular platform of sticks with a central depression; a few pieces of string, rope, rags and other odds and ends were mixed up with the structure."

Sometimes no nest at all is made. Dodsworth found two eggs laid on the ground inside a crevice in a cliff-face, while Hopwood took two beautiful incubated eggs in a cleft in the sandstone banks of a river some 60 miles from Monywa on the 7th March (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 1091, 1912). In 1911 (the previous year) he had found three young in the same place on the 15th April.

The normal breeding season is from the middle of March to the first week in May, most eggs being laid during April. In the North-West the breeding season commences rather earlier, while in the South of India birds probably breed in January and February. Second layings are of course late, and I have seen some as late as early June. In Burma I have records of clutches of eggs laid from the 7th March to the 25th May.

The eggs go through the same range of variation as those of an English Peregrine and are very handsome. The majority of those I have taken myself have been the produce of two pairs of birds which laid eggs unusually large and unusually beautiful. Those of one pair are of the type with a rather pinkish brick-red ground, the whole surface finely mottled with dark brick-red specks and mottlings, one egg in the clutch often being more decidedly pink in colour and with deeper purplish-red markings than the rest. The second pair laid eggs with a pale yellowish-buff to pinkish-buff ground-colour, boldly but not so densely blotched with deep red. The various clutches laid by these two pairs over a long period, lasting from 1905 to 1925, differed more from one another than do those of most birds, but they keep fairly well to the one type. The unicoloured brick-red type, not uncommon in Peregrines' eggs, is exceptional in the eggs of this bird; on the other hand, the dull buff, poorly coloured egg is not rare. A very beautiful pair of hard-set eggs taken by Hopwood has the ground a rich buff, the larger ends capped with deep brick-red, while the rest of the surface is more sparsely speckled and has also small blotches of the same colour.

In size the eggs are much smaller than those of the Peregrine. Sixty-five eggs average 51.8×40.7 mm.: maxima 58.5×42.0 and 56.0×44.0 mm.; minima 43.9×39.2 and 51.2×38.0 mm.

Out of the above sixty-five eggs no less than forty are my own taking and, as I have said above, are nearly all the produce of two pairs of birds which laid unusually large eggs. Of eggs taken elsewhere I have records of two taken by Hopwood, three by

Mackenzie, seven taken near Simla by Dodsworth and Jones and two taken by Mackinnon near Mussoorie. Hume also has measurements of six. These twenty eggs give an average measurement of only 51.5×40.0 mm., and this latter will, I expect, more nearly represent the normal.

I think the female only incubates, while during the heat of the day the eggs are generally left to look after themselves. Dodsworth records of one pair which had two chicks and a nearly hatched egg on the 27th April that, though he had watched the birds from the 18th March to the 27th April, he had always seen both sitting on the cliff above the nest and never on it. In Assam, possibly because of the greater chance of rain, the birds sat closer and we generally disturbed the female off the nest. Both birds assist in building and repairing the nest, the male bringing and the female placing the material in position.

When the eggs or young are interfered with the birds generally soar overhead, screaming and sometimes swooping at the intruder but never, so far as I know, actually striking him. Incubation takes twenty-five to twenty-seven days, this being ascertained and confirmed by the watching of some second layings of birds in the Khasia Hills.

These birds either live to an immense age or else the surviving male or female takes a new mate and keeps to the same nest, for these are sometimes occupied for at least forty years in succession.

(1721) *Falco jugger* Gray.

THE LAGGAR FALCON.

Falco jugger, Fauna B. I., Birds, 2nd ed. vol. v, p. 37.

The Laggar Falcon is found over practically the whole of India from the Himalayas to the extreme South but not in Ceylon. On the West it ranges from Sind, Baluchistan and Afghanistan as far East as Western Assam. I twice obtained it in the Surrma Valley, but neither Coltart, Stevens nor I ever met with it in Upper Assam. Livesey informs me that it is a common bird in the dry zone in Central Burma and that he has repeatedly seen it there.

In Sind and many parts of North-Western India the Laggar builds its nest as a rule on buildings, either making a nest for itself or usurping that of a Neophron. In Eastern and in Southern India the Falcon normally breeds on trees, using old nests of other birds or, rarely, building a nest for itself. Even in the East, however, buildings are sometimes made use of, just as in the West old nests in trees of other birds are sometimes taken possession of. Hume says that he himself found nests "in the face of ancient ramparts where one or two stones have disappeared, or on more or less inaccessible cornices of ruined buildings. I found a nest in the exterior walls of Togluck Shah's grand Egyptian mausoleum,

another in one of the lateral walls of the high gate of Futtehpoore Sikri." In Sind, as one would expect, the birds build their nests on houses etc., and Butler found a nest on the Karachi Church steeple, the lightning conductor running through the centre of it, and another—a deserted Kite's nest—on the station flag-staff. Even in Sind, however, they sometimes breed on trees. Scrope Doig found one, out of over a dozen nests inspected by him, built "in the fork of a pollarded kundy tree"; Eates has occasionally seen eggs laid in nests in trees, and Ticehurst writes (*Ibis*, 1923, p. 259): "In the more wooded parts a pollarded acacia is very often selected."

There is yet a third and very popular kind of site, and this is on a ledge of a cliff or on the steep clay-banks of a river. Hume took nests "on ledges or in recesses of rocky or earthen cliffs." Anderson took a nest containing five eggs on "a ledge in a high mud-cliff which overlooked the Ganges." As regards the nest itself, when on trees this is almost invariably an old nest of another bird. Sometimes it is as small as a Crow's (*Osmaston*) or as huge as that of *Haliaeetus leucoryphus* (Ingis), most often it is that of a Kite. When on a building it is sometimes self-constructed, more often that of a Kite or *Neophron*; if the former it may be very large, mostly from yearly additions to the first-made nest, or it may be merely a handful of sticks, feathers and rubbish. On ledges of cliffs and river-banks it may also be large but, more often, it is very primitive while, occasionally, the bird deposits its eggs on the bare earth or rock.

When breeding on trees, especially in Bengal, Orissa and the better-wooded parts of India, the Laggar usurps the nests of birds which have built high up in such big trees as Peepul, Banyan, Mango etc., often 30 and 40 feet from the ground. In Sind, Rajputana and the Punjab, however, where big trees are rare, they will lay their eggs in nests in small *Acacia* and other trees 12 or, rarely, not more than 6 feet from the ground.

They do not seem to mind much where the trees grow. They may be in orchards, such as Mango-trees growing closely together and giving deep shade, or they may be in a solitary tree in a wide stretch of cultivation or more or less barren waste. Anderson writes of one found by him "on what had been a large peepul-tree, but which had become a gaunt, white, spectre-like thing with two or three hnge, nearly bare arms, each with a dense cluster of leafy twigs near the extremity. The tree stood solitary in the midst of a wide tract of land, overflowed during the rains, but at the time I speak of waste and parched, with no other vegetation for a good mile in any direction. The nest was in one of the highest clusters." In contrast to this the birds occasionally breed in thin deciduous forest but never in deep evergreen forest. As Thompson says, they prefer a lofty tree in "open, cultivated country, with others standing near it; even when it is a forest bird it chooses

such parts as are tolerably open, with widely spreading glades, but habitually it prefers open localities."

The breeding season seems to be January to March over the whole of its habitat except Sind, the very great majority of the eggs being laid in February. In Sind, though many birds lay in February and March, other do not lay until April, while Vidal took one clutch of four as late as the 15th of that month.

The eggs number three or four, rarely two only or five.

Compared with eggs of the true Peregrines they are very pale, but can be matched with many eggs of these birds and are often quite as beautiful. Most eggs have a pinkish-buff or pale brick-red ground, this being blotched profusely all over with definite blotches of pale brick-red or of reddish-brown. Some eggs, generally an odd one in a clutch, have a pale rose-pink ground, rather sparsely spotted and blotched with pale reddish-brown or brown, with numerous secondary blotches of pale lavender; such eggs are often exceptionally beautiful. Many clutches have pale yellow or dingy pale buff ground, freckled all over with dingy reddish, while occasionally an egg looks as if uniform brick-red, the overlying freckles obscuring the ground. As a rule the markings, of whatever character, are more or less evenly distributed over the whole egg, but a few specimens show indefinite caps at the larger end. I have one clutch which has a few broad, wavy streaks of dark dull brown as well as many speckles and small blotches of reddish-brown.

Sixty eggs average 50.0×39.4 mm.; maxima 54.7×39.3 and 51.0×41.0 mm.; minima 46.5×39.4 and 49.0×36.2 mm.

Both sexes incubate and both assist in building or repairing the nest, the male fetching the material, which the female builds into the structure.

An extraordinary characteristic of this Falcon and, I personally believe, of all birds of prey, is that they never prey upon birds which nest in their immediate vicinity and, so to speak, throw themselves on their mercy. I have noticed this trait many times in connection with Peregrines, Shaheens and others, while as regards this Falcon instances are frequent. Anderson records an instance of a pair of Doves (*T. risorius*) having their nest with young in the same gaunt tree already described as that occupied by a pair of Falcons. When found the Falcons were devouring a Roller, and all about under the tree were remains of "at least 50 individuals of their own species," i. e. the Dove's.

These birds are remarkably close sitters. Anderson in one case shot the male when sitting near its nest, and the female never moved until a man climbing up the tree stretched out his hand to take the eggs, when she slipped off the nest, first jabbing her beak through one of the eggs, an action not altogether rare among birds of prey.

Falco subbuteo Linn.**THE HOBBY.**(1725) **Falco subbuteo centralasiæ Buturlin.****THE CENTRAL ASIAN HOBBY.***Falco subbuteo centralasiæ*, Fauna B. I., Birds, 2nd ed. vol. v, p. 43.

This Hobby breeds in Central Asia, South to the Himalayas, possibly as far East as Assam. Rattray, Buchanan, Wilson and Osmaston obtained its nests round Murree, while Jones found it breeding in the Simla States. Ward says that it breeds freely in the higher hills of Kashmir; Whitehead found it breeding in the Karraam and Khagan Valleys. Everywhere it seems restricted to elevations above 5,000 feet. Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xxxii, p. 143, 1928) found nests up to 10,500 feet, while in Tibet it breeds up to about 14,000 feet.

The nidification of this Hobby is very little known and in some cases the Indian Hobby, *F. s. rufipedoides*, and the present bird seem to have been confounded with one another. The records, however, of Jones in Simla, Dodsworth in the same place and in the Patiala State, Osmaston in Ladak and Macdonald in Tibet do undoubtedly refer to this bird. The first record of its breeding is that of Jones (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 579, 1915; vol. xxiv, p. 359, 1916). In 1914 Jones found a nest with three young on the 10th August. The description of the nest is as follows:—"The situation of the nest was on three horizontal branches and 40 feet up in a Deodar (*C. deodara*). It was oblong in shape, measuring approximately 12" x 10" by 2½ in depth, with a central depression of 2 inches. The nest was composed of fine twigs which did not exceed the diameter of an ordinary pencil. There were three young in the nest which were 16-18 days old. The old birds brought food at intervals of 10 to 15 minutes. As the parent bird alighted on the nest the young greedily rushed to secure the tit-bit, which was always carried in the feet. The duration of these visits lasted only a few seconds.

"Probably the nursery of these young Hobbies had originally been built by Crows (*C. macrorhynchus*) and had been altered to suit the requirements of the former."

In 1915 Jones again found a nest, this time one with three eggs, on the 27th June, the eggs being slightly incubated. This "nest was on the outskirts of Deodar forest placed 65 feet up in a Deodar at an elevation of 6,000 feet," and was one "undoubtedly built by Crows."

A clutch sent me from near Rhamtso and taken at about 14,000 feet was said to have laid in "a dilapidated nest, probably a Magpie's, in a stunted thorn-bush." These were hard-set on the 29th May, perhaps unusually early.

Finally we have Osmaston's account of his finds in Ladak (*ibid.* vol. xxxii, p. 143, 1926): "July is the month when nidification takes place. The nest is placed fairly high up in a tree. A nest found in the Indus Valley at 10,500 feet above Chushot was in a Poplar Grove. The nest was incomplete in June. A second nest at Kargil, 9,000 feet, in Ladakh, was also in a Poplar-tree, in the nest of a Carrion-Crow from which I had previously taken eggs. On August the 4th it contained three young in down. A third nest was half-way up a spruce-fir standing on an island in the Lidar River near Pahlgaon at 7,000 feet. It contained three fresh eggs in August which resemble Kestrels' eggs in colour. A fourth nest was in the top of a Silver-fir in Gulmarg in July."

Yet a fifth nest, the three eggs from which were sent to me, was taken by Osmaston on the 28th June. This also was half-way up a spruce standing on an island in the Lidar River.

From the above it seems that this Hobby breeds from 6,000 to 14,000 feet throughout the Himalayas as far East as Central South Tibet, sometimes breeding in the interior of dense forests but, at other times, breeding in groves and single trees in open country and occasionally in solitary trees or in stunted thorns standing all alone in wide waste lands. Apparently they always lay in the nests of other birds and generally in those of Crows or Magpies; sometimes they use them as they are, while at other times they repair and add to them before laying their eggs.

The laying season appears to be from the end of May to early July and the fresh eggs obtained in August by Osmaston must be unusually late.

The full clutch is three or, rarely, four and the eggs are exactly like those of the European Hobby. The ground varies from dull yellowish-buff to dull pale brick-red, the eggs being normally speckled and spotted all over very densely with darker dull brick-red and brown, with a few small blotches of purple-black. The eggs have been said to resemble those of the Merlin and Kestrel, but they are much duller eggs than those of these birds. It is rare to find an egg at all richly blotched, but a few may be rather more boldly blotched and with rather brighter colour than usual. The texture is rather coarse and quite glossless and the shape is a broad obtuse oval, though I have one clutch the eggs of which are long ovals in shape.

Twenty-eight eggs average 41.4×33.0 mm.: maxima 44.3×31.0 and 40.8×34.2 mm.; minima 38.4×31.6 and 44.3×31.0 mm.

Both birds assist in incubation, Jones shooting a male off the nest.

(1727) '*Falco subbuteo streichi* Hartert & Neum.

THE CHINESE HOBBY.

Falco subbuteo streichi, Fauna B. I., Birds, 2nd ed. vol. v, p. 44.

This bird breeds in South China but, though it almost certainly also breeds in the Shan States, its nest has not yet been taken there.

Harington obtained a Hobby in the Ruby Mines district which he says was *not severus*, while Livesey and Cock both record Hobbies from the Shan States, and there is a specimen of this race in the British Museum Collection from that country.

La Touche and Rickett obtained it breeding freely in Fokhien from May to July, while Vaughan and Jones obtained eggs near Howlik in June and July. The breeding is the same as that of the other races, the birds laying three or four eggs in Crows' nests very high up.

Twenty eggs average 40.1×31.7 mm. : maxima 43.1×32.5 and 40.6×34.0 mm. ; minima 38.8×29.7 and 38.5×29.5 mm.

Falco severus.

THE BURMESE HOBBY.

(1728) **Falco severus severus** Horsf.

THE BURMESE HOBBY.

Falco severus severus, Fauna B.I., Birds, 2nd ed. vol. v, p. 45.

This handsome little Falcon is a resident breeding bird from Assam, Cachar, Manipur, the whole of Burma from the Northern hills to Tenasserim ; Siam ; probably the Malay States, to the Philippines. It has also been recorded from Trangbong in Cochin China. It occurs in the hill country only, I believe, but at no very great elevations. In North Cachar (Journ. Bomb. Nat. Hist. Soc. vol. xi, p. 403, 1898) I saw its nest, which I could not get at, at about 2,500 feet, while in the Khasia Hills several pairs bred in the precipitous hills facing the Sylhet district, between 3,000 and 4,000 feet. Macdonald also found a nest with one young bird in Pakokku (*ibid.* vol. xvi, p. 518, 1905).

This is a Falcon of well-wooded country and even of forests, but it prefers wide open spaces with ample tree-growth and not much underwood.

In the Assam Hills we found them breeding only on precipitous cliff-sides, sometimes heavily wooded on the lower slopes but, generally, only scantily dotted with trees and bushes on the higher parts, which were for the most part too steep, and with too little soil, except in the crevices and on the ledges, for much vegetation. Here the birds made use of an old nest of a Crow, Magpie or Wood-Pigeon. Sometimes, beyond adding a little lining, practically nothing more was done to the nest but, at other times, the birds would add much material and a fine lining of leaves and green twigs.

Occasionally I think these Falcons make nests for themselves in trees. One nest I found at Lilancote was built in a small tree growing out of a cleft in a steep hill-side and was made of fine, rather

long twigs, none as thick as a pencil and, when first found, all fairly new and fresh, as was the lining of leaves and twigs. A second nest belonging to this same pair of Hobbies, some 200 yards away, was similar in position and make and had also, I believe, been made by the birds themselves.

These nests, though quite unapproachable from above, were easily climbed up to from below, and of all the nests I have seen of this Hobby only two defeated us, and even these might have been reached with ropes had they been available. At the same time they always, in my experience, choose sites on cliff-sides or the faces of very steep hills, and I have seen none on the flat. Occasionally the birds find or make a nest on the ground on a ledge of rock or earth and, in such cases, it may consist of a very meagre collection of a few sticks or tufts of coarse grass. K. C. Macdonald (*loc. cit.*) says: "On the 13th May I found the Indian Hobby (*F. severus*) breeding on the banks of the Nugittha River in this district. The nest was in a hole in the cliff about 30 feet above the water-level. I should rather say the solitary young bird was in the hole, as there was no nest."

Most pairs of Hobbies seem to have alternate nests for laying in, and we found these sometimes quite close to one another and at other times at considerable distances apart. In one instance the two nests were not separated by more than 200 yards, but in another they were over half a mile apart. Each pair, however, nearly always selected similar sites for the two abodes. One pair chose quite small trees growing out of crevices in precipices, another tall Pine-trees growing on precipitous and heavily-wooded sides of very steep hills, while yet a third pair had both their nests on ledges of rock on cliff-faces; these nests seemed to be occupied in no particular order or system, though when a nest was robbed the birds nearly always went to the second nest, in which they laid another clutch which we never interfered with.

The breeding season is from the last week in March to the first week in May, but I have taken eggs as late as the 19th June, though I think these were a second laying.

The eggs are like those of the English Hobby but, on the whole, better and more richly marked. The ground is a buff, reddish-buff or light rich brick-red. In some eggs the whole surface is almost obliterated with dark brick-red, brownish-red or purplish-red specks but in some the markings are bolder, richer and stand out more from the ground-colour, somewhat approaching Merlin's eggs in type. Almost unicoloured brick-red eggs are not rare.

In shape they are broad ovals; the texture is fairly fine and close but the surface has no gloss.

Fifty-four eggs average 40.1×31.9 mm.: maxima 41.4×33.0 and 41.1×34.0 mm.; minima 37.1×30.9 and 38.4×30.0 mm.

Both birds incubate and both assist in the nest work, but I think the male does the bringing of the material and the female does the patch-work.

Incubation takes twenty-six days. A clutch taken in April was replaced with four eggs on the 27th May, when the hen began to sit, and the first egg hatched on the 16th June and the three others the next day. The young stayed in the nest for over a month.

When a nest is robbed the birds both fly screaming overhead but will not attack the intruder.

(1729) *Falco severus rufipedoides* Hodgs.

THE INDIAN HOBBY.

Falco severus rufipedoides, Fauna B. I., Birds, 2nd ed. vol. v, p. 47.

The Indian Hobby breeds in the North-Western Himalayas and as far East as West Assam North of the Brahmapootra, while it is said to breed also in the hills of Southern India. It certainly occurs and must breed in the Travancore hills, and A. M. Primrose was told that it bred in the Gunjarra precipices and valleys in the Nilgiri Hills.

In Kashmir it probably breeds fairly commonly, but it is impossible to say what records apply to this bird and what to the Central Asian Hobby. Donald (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 841, 1903) writes: "I found a nest in Hursil, Tehri Garhwal, about 30 miles from the source of the Ganges, at an elevation of about 8,500 feet, with four half-fledged youngsters in it, in July, and again two young ones were brought to me by a villager here last September, showing that *Falco severus* does breed in India."

Mackinnon apparently obtained two or more nests of this bird round about Mussoorie, but in his notes, bought after his death with his collection by Mackenzie, there is nothing about them. One clutch given by him to Harrington Bulkley, and later obtained by me, was found on the 14th June with three eggs.

As regards their nidification, it differs, so far as we know at present, in no way from that of the typical Burmese form. They seem to select nests of other birds, built in trees, small or large, growing in precipitous places both in and on the outskirts of forest and in open country.

The breeding season is probably late May and June, while the full clutch numbers three or four eggs which, in appearance, are not distinguishable from those of the preceding bird.

The only three I have been able to measure were 41.4×32.0, 40.2×29.0 and 40.8×31.0 mm. - -

Falco chiquera.**THE RED-HEADED MERLIN.**(1730 *Falco chiquera chiquera* Daudin.**THE INDIAN RED-HEADED MERLIN.***Falco chiquera chiquera*, Fauna B. I., Birds, 2nd ed. vol. v, p. 47.

The Turumti, the Indian name by which this bird is so often called, is spread over practically the whole of India from the base of the Himalayas to the extreme South. It extends West from Sind to the Surma Valley in the East, and Hume also records it from Manipur. In the Brahmapootra Valley we never came across it.

So well known was this bird even in Hume's time that it is almost impossible to add anything to what Hume has already recorded in 'Nests and Eggs,' where he writes:—"They nest, I believe, exclusively on trees. I have no record of their building on rocks, as so many Falcons do; and I once took a nest in the Sewalik in a peepul-tree, at the foot of a cliff, full of ledges and boulder-holes, which, had the bird any sort of inclination for such localities, would have been sure to have attracted it.

"Where such occur, they prefer large trees—peepul, mango, and tamarind, usually selecting one of a small group standing by itself. In the Punjab and Rajputana, where large trees are scarce, their nests may be found on mere bushes, not above 10 feet from the ground.

"The nest is generally fixed in a fork near the top of the tree, and is typically a very neat, compact, and characteristic structure; it is usually circular, some 12 inches in diameter, and from 6 to 9 inches in thickness, with a deep egg-cavity, 5 to 6 inches in diameter, and from 3 to 3.5 in depth; but I have seen some nests comparatively thin platforms, with only a depression from 1.5 to 2 inches in the centre. The lower portion of the nest is constructed of pretty stout twigs, of various kinds of wood, closely put together; the upper portion of finer twigs still more closely interwoven. The egg-cavity is lined with fine roots or vegetable fibre, the roots of the khus grass (*Andropogon muricatum*) being commonly chosen for this purpose, along with straw, a few feathers, and occasionally a shred or two of cloth, the lining being firmly intertwined with the twigs forming the walls of the cavity.

"The birds, I think, make their own nests fresh and fresh every year. I have repeatedly seen them building new nests in trees containing very nice last year's nests of Crows and other birds, and I have not as yet ever found a nest tenanted for two successive seasons. Both sexes assist in building, and they make no little fuss about the placing of each twig that is brought up. The normal number of the eggs is four; but I have found the female sitting on

only three. Two nests, each containing five eggs, have been reported to me; but these are very exceptional."

Sometimes, however, these little Falcons do make use of other birds' nests. B. Aitken saw them busy repairing an old nest, though he could not say if it was a Crow's or their own, while his brother, J. Aitken, writing from Akda, says: "In this neighbourhood they more commonly select the old nest of a Crow." Eates, who has taken many nests in Sind, says that there also the great majority breed in old nests of Crows.

The breeding season lasts from January to May, but the great majority of eggs are laid in February and early March.

The eggs are, as Hume says, small replicas of the eggs of the Laggar Falcon and are on the whole very dull and uninteresting, but occasionally a clutch may be taken rather more boldly and brightly blotched than usual, and many are more blotched at the larger than the smaller end, a few eggs being regularly capped. I have one set of eggs with a pale yellow-clay ground curiously marbled all over with dirty brown, quite pale, but with a few deep blood-brown blotches and specks. The eggs bleach and fade very rapidly, but some look as if they had been bleached for a long time even when newly laid.

In shape the eggs vary from broad to rather long ovals, never, however, pointed at the smaller end. The texture is rather coarse and the shell not so stout as it is in the eggs of the Hobby.

One hundred and twenty eggs average 42.4×32.1 mm.; maxima 46.7×31.0 and 41.4×34.0 mm.; minima 38.2×31.4 and 41.3×30.0 mm.

The birds are very bold in defence of young or eggs, but their fussiness and constant pursuit of any Kite or other bird which comes near their nesting-tree soon gives away the site.

Anderson writes that on two occasions his tent was pitched near a Turumti's nesting place, and the birds were "a perfect nuisance, as they were incessantly darting out and driving away all manner of imaginary enemies."

(1733) *Microhierax fringillarius* (Drapiez).

THE BLACK-LEGGED FALCONET.

Microhierax fringillarius, Fauna B. I., Birds, 2nd ed. vol. v, p. 51.

This Pigmy Falcon is found in the South of Tenasserim through the Malay Peninsula to Sumatra, Java and South-West Borneo.

Davison found this little Falcon breeding near Bankasoon. He writes:—"On the 10th or 11th March, while passing through an old tounghah (clearing), I saw a Falconet of the above species fly into a hole in a dry tree; on sending a man up he reported the hole to be empty.

"On the 25th March, happening to pass this tree, I saw the

Falconet fly out and settle on the adjoining tree, where I shot it. I then sent a man up, and while he was examining the hole the other Falconet, which proved to be the female, flew out and settled close by, and I also shot her. On enlarging the hole sufficiently to admit a man's hand, it was found that there were no eggs, but at the bottom of the hole, which was about 18 inches deep, was a soft pad composed of flies' and butterflies' wings, mixed with small pieces of rotten wood. On dissecting the female I found in her a fully-formed hard-shelled egg, but unfortunately broken by the shot. The egg was pure white, without spot or streak of any kind; the texture was fine and close, and when held up against the light it exhibited a very faint yellowish or greenish tint."

Beyond the above there is nothing on record about the nidification of this bird, but Robinson informed me that it has been known to breed in the roofs of houses in the Malay States and that he had seen one such nest containing five eggs in the thatch of a rest-house bungalow.

Microhierax cœrulescens.

THE RED-LEGGED FALCONET.

(1735) *Microhierax cœrulescens burmanicus* Kirke-Swann.

THE BURMESE RED-LEGGED FALCONET.

Microhierax cœrulescens burmanicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 53.

The range of this little Falcon extends from North Burma to Tenasserim and the Malay States and East to the Shan States, Siam and Annam.

Bingham, in Tenasserim, and Kellow, near Perak, were, until 1925, the only persons who had taken the eggs of this bird. The former writes:—"On the 14th April I found a nest of this little Falconet in a hole on the underside of a decayed bough of a mighty pyrama-tree (*Lagerstrœemia flos reginæ*).

"I had noticed the bird about the neighbouring trees for two or three days successively, and on the date above mentioned saw her entering the hole in question.

"On my sending up a servant who was with me, she flew out and perched on a low tree some 30 yards off; keeping my eye on her I desired the man to ascertain if there were any eggs. In about ten minutes he announced that there were four. I then shot the bird, which proved to be the female. The eggs were stained by resting on the broken leaves, wings of dragon-flies, and bits of wood which composed the nest. The nest was probably an old nest of a Barbet. The branch in which it was excavated was about 30 feet from the ground."

In 1908 Kellow sent me a skin of this Falconet with the following note:—"I am sending you a skin of a tiny Falconet caught in

a Barbet's nesting-hole on the 11th February which contained a single egg, also sent; whether the Falcon had eaten the others I don't know. The nest-hole was full of beetle-wings and was in a tree by itself standing outside heavy forest in the foot-hills about 20 miles from here" (Perak).

The egg sent by Kellow measures 30.2×26.2 mm. and is, of course, that of the Falconet, bearing no resemblance to a Barbet's egg. It is, in fact, more like a tiny egg of an *Astur badius*, but has a texture which reminds one of that of a Coucal's egg, very strong, fine, close texture with a smooth soapy surface. The inner membrane, when fresh, was possibly a pale yellowish-green, but it is dirty and badly blown and may have been pure white as in the egg taken by Bingham*. Hume describes the eggs taken by Bingham as dead white, suffused with a dirty yellow tint, such as is often the case with the very similar eggs of *Centrococcyx* and *Taccocua*. They measured 1.1 to 1.3 inches in length ($=27.9$ to 33.0 mm.) and .85 to .88 inches in breadth ($=23.6$ to 24.5 mm.).

***Microhierax melanoleucus*.**

THE WHITE-LEGGED FALCONET.

(1736) *Microhierax melanoleucus melanoleucus* Blyth.

THE INDIAN WHITE-LEGGED FALCONET.

Microhierax melanoleucus melanoleucus, Fauna B. I., Birds, 2nd ed. vol. v, p. 54.

This species of Falconet is found over the whole of Assam and Manipur. Chennell obtained it in Jaipur in the extreme West of Assam, and I have myself obtained it in Manipur, while it also occurs in Hill Tippera and Chittagong in Eastern Bengal.

This fine little bird is a resident wherever found from the Plains up to some 5,000 feet in the hills, but it is most common between the plains adjacent to the hills and about 3,000 feet. It is equally a bird of clearings and more open spaces in heavy forest and the open land of tea-gardens and semi-cultivated fields and grass. Perhaps of all kinds of country it prefers tea-gardens alongside forest where a few of the larger trees are still allowed to stand.

It lays its eggs in the deserted nest-holes of Woodpeckers and Barbets, but beyond this really very little is known. The first egg taken was one found by myself laid in a Barbet's nest-hole at Gunjong in the North Cachar Hills at about 2,500 feet. The

* As I was sending this MS. to the printers I received with other eggs from Mr. T. A. Livesey a beautiful clutch of five eggs of this Falcon. They are pure white and of the texture already described. They were taken in 1925 by one of Livesey's collectors with a parent bird in a natural hole in a tree, with the usual pad of insect remains. The breeding was so unlike what might have been expected that the man's story was not believed until an egg had been sent to me for identification.

tree was a big one and the nest-hole was bored in the under-surface of a branch about 40 feet from the ground. At the bottom of the hole were two good handfuls of beetles' elytra and other insect remains, buried among which was a single egg. The female was shot as she flew from the hole and, on dissection, proved to contain another egg of which the shell was just forming, and others in different stages of development. The tree, standing in a clearing in forest, was one which had been ringed and died, but was still sound except in one or two branches.

Coltart also obtained single eggs of this Barbet from very similar trees in similar positions and one from a hole in an enormous Cotton-tree, standing in tea-cultivation, fully 100 feet from the ground. In each case the nest-hole was nearly half full of remains of insects, beetles, dragonflies and termites, the wings of the two former making quite a soft bed. The birds must either use the same hole several succeeding years or must eat much of their insect food inside the nest-hole even before they have laid any eggs.

The breeding season seems to be from early March to the middle of May, but neither Coltart nor I have ever succeeded in taking more than a single egg, whereas the full clutch must be three or four at least, as we have seen that number of young birds with their parents.

The eggs are exactly like those of the Black-legged Falconet already described and have the same soapy surface and same pale yellowish-green inner membrane when fresh.

Six eggs average 27.9×22.4 mm. : maxima 29.1×22.3 mm. ; minima 24.0×20.4 mm.

Both sexes incubate or, perhaps, one should say that both sexes have been shot flying out of holes in which an egg had been deposited.

Neohierax insignis.

THE GREY FALCONET.

(1737) *Neohierax insignis insignis* Walden.

FEILDEN'S, OF THE BURMESE, GREY FALCONET.

Neohierax insignis insignis, Fauna B. I., Birds, 2nd ed. vol. v, p. 56.

This Hawk or Falconet is found over the whole of Burma from the Chin and Kachin Hills and the Shan States to, but not including, Tenasserim.

Practically nothing is known of the breeding of this bird. Bingham says that it makes a nest of sticks and twigs, while Coltart had a clutch of eggs sent to him by a friend in Burma, also said to have been taken from a stick-nest in a low tree. The eggs, unfortunately, arrived smashed to pieces and could not even be measured. They appeared as if they had been very much like small eggs of *Astur badius*, being a grey-white in colour, quite without any marking.

(1730) *Erythropus amurensis* (Radde).

THE EASTERN RED-LEGGED FALCON.

Erythropus amurensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 58.

The normal breeding range of this very pretty little Falcon extends from Lake Baikal in Siberia to Manchuria and North China.

Every year, however, the birds when on migration pass through the North Cachar Hills in hundreds and thousands on their way to Southern China and Burma and then again on their return journey North in March and April. Out of these vast numbers a few pairs remain in these hills and, probably, in many other hill countries, to breed or, perhaps, a few birds are already becoming sedentary and do not migrate at all. At the same time I do not remember ever seeing them in winter in the hills.

In Northern China Vaughan, Jones and La Touche took many eggs from Magpies' nests on trees round villages and quite in the open, the few nests I found in North Cachar being built in very similar places. The trees selected were either single trees growing in the half-grazed, half-trodden-down grasslands round the Naga villages or else in a tree in a small patch of forest overhanging some village path. One nest taken on the 25th April was built in a very big Nagessur-tree between 60 and 70 feet from the ground, both birds being repeatedly seen flying to and from the nest as I watched them for some hours. This nest, which was about a foot across and 3 or 4 inches thick, looked as if it had been made by the birds, but more probably was a Pigeon's of some kind added to by the Falcons. It was very roughly made of sticks and twigs. A second nest was in a small thinly foliated tree standing in some grassland much trodden down by the village buffaloes. It was growing on the edge of a cliff but was quite easy to climb, while the nest was obviously an old one of a Jungle Crow.

In Manchuria the breeding season seems to be a very extended one, and I have seen eggs taken from early April to late June, while in China La Touche and Jones took eggs in late June and early July. In North Cachar the few nests seen were between the 25th April and 16th May.

The number of eggs in a full clutch varies from four to six, while in appearance they go through all the variations seen in the eggs of the Common Kestrel. In my small series of ten or twelve clutches I have eggs which have a brick-red ground closely mottled and freckled all over with deep blood-red, a few of the darkest blotches almost black. To contrast with these dark handsome eggs there are others with a creamy ground lightly speckled, spotted and smeared with pale orange-red. Others vary between these two extremes both in colour and density of marking. Some are more definitely blotched with reddish-brown, deep red or blackish-red, while others, again, have few blotches but either sparse or innumerable minute specks of the same colour.

In shape they are normally broad, short ovals; the texture is rather coarse, not very compact, and the eggs are fragile for their size; the surface is fairly smooth but glossless.

Fifty eggs average 35.8×28.9 mm.: maxima 38.9×28.9 and 38.2×32.0 mm.; minima 33.0×27.1 mm.

Both birds incubate, as I saw both go on to the nest and settle on it, one bird relieving the other. While we were watching them the birds seemed to sit for very brief periods, for during the time we watched, not more than two hours, they changed twice. They made no demonstrations while the boy climbed the tree and took the eggs, but while we watched them we saw first one and then both birds attack a pair of Crows which were flapping past, swooping down on them continually until they had passed the zone the Falcons considered dangerous.

The Jetinga Valley, in which, or above which, I took my nests, is on the main route of the Falcons' migration, and the local birds passed on South with the vast myriads which appear in Autumn, coming back with the smaller numbers which return in March.

Cerchneis tinnunculus (Linn.).

THE KESTREL.

(1741) *Cerchneis tinnunculus interstinctus* McClell.

THE HIMALAYAN KESTREL.

Cerchneis tinnunculus interstinctus, Fauna B. I., Birds, 2nd ed. vol. v, p. 62.

This race of the Kestrel breeds in the lower ranges of the Himalayas between 2,000 and 8,000 feet, from Kashmir and the North-West Frontier to Assam and Manipur. It is quite possible that this race of Kestrel may breed at still higher levels than 8,000 feet, but it is more probable that the birds seen and nesting at the higher altitudes are all *japonensis*.

Fulton records their breeding from 4,000 feet upwards in Chitral and mentions seeing one at 18,000 but, whilst those breeding at the lower levels are undoubtedly *interstinctus*, it is not certain to what race those breeding at the higher elevations really belong. Kinnear and Ludlow identify two specimens shot by the latter off their nests in the Tian Shan as typical *tinnunculus*, but I should place them under *japonensis*. Much more breeding material is still required to settle the breeding range of the various races.

The present bird is a very common resident in the lower Himalayas and many collectors have taken its eggs, these having all been recorded as those of the typical European form.

About Naini Tal Whympner found it breeding commonly between 4,000 and 5,000 feet and took several clutches of eggs, now in my collection.

During the breeding season the birds seem to prefer rugged hill-sides, cliffs and precipices, the very great majority laying their eggs in clefts of rocks, ledges on a cliff-face or in similar places. Sometimes the birds make a rough and rather meagre nest of sticks, grass and rubbish, often using bits of rag and cloth mixed in with these; at other times there is no trace of a nest, the eggs being laid on the bare rock or earth.

Hume writes ('Nests and Eggs,' vol. iii, p. 195) of nests as follows:—"The nest is round, oblong, or semicircular, according to the shape of the site chosen, and is a thicker or thinner platform 12 to 20 inches in diameter, and 2 to 6 in thickness, made of small twigs, in which grass, roots, rags, and, as Mr. Thompson informs me, at times strips of cloth, $\frac{1}{4}$ yard in length, are incorporated, and serve as lining."

In contrast to this Betham writes (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 831, 1907):—"The nests, if such they can be called, the eggs being laid on the bare ground, were all situated in holes or on ledges in the perpendicular banks of a river. As these were only some 30 feet high, they were very easy of access. I obtained my first clutch of five on the 12th April. I had noticed a pair haunting a particular locality where there was a suspicious looking hole. On flinging a clod of earth at this, out flew madam. I did not take long to get the eggs, which were fresh. I then got four eggs from a ledge, which were exposed to the heavens with no protection. The third clutch was taken on the 24th May. On this occasion the eggs were laid some way in and the female sat very close."

Yet a third type of site is an empty or deserted nest of a Crow or other bird; this, however, is exceptional. Marshall (C. N. T.) near Murree "found a nest about 60 feet up in a pine-tree with five hard-set eggs in it. This was on the 11th June. The nest was one apparently originally belonging to *Corvus macrorhynchus*." Rattray also found Kestrels' nests near Murree, one in a Crow's nest in a tree and others on rocks, while Ward also took a clutch of eggs from a Crow's nest in Kashmir:

Rarely they breed in holes in walls of buildings, Theobald finding one such in "a hole in a serai wall of Thanna, South of Biramgaala, Shahabad."

The breeding season lasts from mid-April to mid-June, but Ward obtained one clutch of eggs, very hard set, on the 15th July.

The eggs, numbering four to six in a clutch, are quite indistinguishable from those of the Common Kestrel and go through the same range of variation. Some are a deep, almost unicoloured brick-red or purplish-red; others have a pink-red, pale brick-red or buff ground handsomely and boldly blotched all over with deep red of various shades; other eggs are freckled instead of blotched, and every intermediate form may be met with. A very curious clutch taken by Ward at Rattu has a white ground, rather feebly blotched all over with dark sienna-brown. Another clutch taken by Whitehead in the Khagan Valley has a salmon ground blotched with purple-brown, heavily at the larger ends, scantily elsewhere.

In shape the eggs are broad ovals, the texture coarse and not very close, and the surface with no gloss.

Sixty-eight eggs average 39.3×31.6 mm.: maxima 41.1×32.7 and 40.3×34.1 mm.; minima 37.4×31.0 and 40.0×29.3 .

Both birds incubate, but the female seems to do more incubation than the male.

(1742) *Cerchneis tinnunculus saturatus* Blyth.

THE BURMESE KESTREL.

Cerchneis tinnunculus saturatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 63.

The Burmese Kestrel is found in Northern Burma from the Upper Chindwin to the Shan States and Yunnan, extending South through the hills of Central and Eastern Burma. Grant found a Kestrel breeding in Arakan and a Kestrel of some race also breeds in the Chin Hills which may be either *saturatus* or *interstinctus* or intermediate between the two.

We know nothing of its breedings beyond Wardlaw Ramsay's report that it "is very abundant in Karen-nee, where the rocky precipices afford it good nesting places. It is by no means common in the plains."

(1743) *Cerchneis tinnunculus japonensis* Ticehurst.

THE JAPANESE KESTREL.

Cerchneis tinnunculus japonicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 64.

Cerchneis tinnunculus manchuricus, *ibid.* vol. vii, p. 403, March 1930.

Cerchneis tinnunculus japonensis Ticehurst, Bull. B. O. C. vol. i, p. 10, October 1929.

My name *manchuricus*, which was in MS. in March 1929, was not published until March 1930, and is therefore superseded by Ticehurst's name *japonensis*, published on October 31st, 1929.

The actual breeding range of this subspecies of Kestrel is still very ill defined. It undoubtedly breeds in Manchuria and Japan, and I believe all the breeding birds in North China and Central Asia to the Himalayas in the highest altitudes should be placed under this trinomial, as I can find no single character by which Tibetan and high altitude birds from Kashmir and Ladak can be separated from those of Japan. The exact elevation to which they descend to in the Himalayas is still a matter of conjecture. I have eggs taken at Sonamurg and other places in Kashmir between 9,000 and 11,500 feet which I believe must be attributed to *japonensis*. Osmaston obtained clutches in Ladak at 11,000 to 12,000 feet, and I have had several sent me from Tibet taken at elevations between 12,000 and 14,000 feet. I have also a very fine series from Manchuria taken by Smirnoff.

In its breeding habits this subspecies does not differ from the other Kestrels but, whereas the Himalayan Kestrel nearly always

breeds on cliffs and precipices and very rarely in other birds' nests on trees, the present race far more often places its eggs in other birds' nests and less often in holes and on ledges in cliffs. Osmaston found two nests in Ladak, both in Poplar-trees and both in old nests of Crows. One of these nests was actually on a tree in Leh town. In Tibet Steen took eggs both in holes in cliff-faces and in old nests of other birds while, later, Macdonald found yet more nests in the same. Buchanan, in the Liddar Valley, at about 10,000 feet, took one clutch of eggs from a hole in a cliff, and another from a deserted nest of *Corvus macrorhynchus*.

The breeding season is rather later than that of *interstinctus*, most birds laying between the last week of May and the first week of July. In Siberia, Japan and Manchuria the majority lay in May and early June.

The full clutch contains four to six eggs. These differ in no way from those of the Himalayan Kestrel in colour, shape or texture, but average somewhat bigger.

Sixty eggs average 40.1×33.6 mm.; maxima 43.4×33.5 and 42.3×34.7 mm.; minima 37.1×30.5 and 41.2×29.0 mm.

Tibetan eggs are very big, fourteen of these averaging 41.8×33.6 mm.

I know nothing about their habits calling for special remarks.

(1744) *Cerchneis tinnunculus objurgatus* Stuart Baker.

THE INDIAN KESTREL.

Cerchneis tinnunculus objurgatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 65.

There is little to be added to the distribution of this Kestrel as given in the 'Fauna': "A resident breeding-form in Ceylon, Travancore and the hill-ranges of Mysore and Southern India. It has long been known to breed about the Gairsoppa Falls and in the Nilgiris; both Bourdillon and Stewart knew it to breed in North and South Travancore; it has also been obtained in June and July in the Nelliampathy Hills, whilst Davidson believed it to breed in the steeper and more rugged ravines and hills in the Kanara District of Bombay." To this we may add that Betham found it breeding in Poona, where B. Aitken had already reported its almost certain nesting.

In the Nilgiris its eggs have frequently been taken at elevations between 4,000 and 8,000 feet, while many nests have been located but found inaccessible, as the birds breed on ledges or in crevices and holes of the steepest and most rugged cliffs or high up on vertical outcrops of rock which are quite unclimbable.

Darling took two clutches of eggs near Neddivitam on the Nilgiris at an elevation of some 6,500 feet, first on the 21st February and secondly on the 1st March. Of these he writes:—"The nest, for it was the same that I robbed in two successive seasons, was placed in a natural hollow in the top of a dead stump, about 14 feet

from the ground. It was circular, and composed of a few pieces of stick, some dry grasses and fibres, and was about 8 inches in diameter, and had a depression about 4 inches deep, which contained four eggs."

From Kotagerry Miss Cockburn gives a description of a nest built in a more normal position. She says:—"I have noticed a pair of these Kestrels appropriate a certain cliff or precipice, and breed there year after year. One pair have thus built on a nearly perpendicular cliff, some hundred feet in height, placing their nest in a small cleft about halfway up. The nest is inaccessible to ordinary mortals, but last year I sent for a couple of Korumbas, and they soon secured both nest and eggs.

"The nest was composed of straws, a very few feathers, and some small pieces of dirty rags, rudely collected together. Its foundation was on a rock, so it needed no other."

The birds are most persistent in returning to their nest, and Davison cites an instance in which for five years running he obtained eggs from the same nest. He also says that he thinks the birds lay again when robbed.

The breeding season seems to be January to February and March.

The only eggs I have seen of this race were some taken by Betham at Poona, and these were, of course, quite indistinguishable from those of other races.

They measure between 39.3×31.6 and 36.4×29.2 mm. and average 38.0×30.2 mm.

Hume must have had numerous eggs of this race sent him by Miss Cockburn, Davison and others, but I can find none amongst his eggs in the British Museum. They were all sent just as specimens of the Common Kestrel, and presumably he must have destroyed them or given them away.

Aquila chrysaëtos Linn.

THE GOLDEN EAGLE.

(1746) *Aquila chrysaëtos daphanea* * Hodgs.

THE HIMALAYAN GOLDEN EAGLE.

Aquila chrysaëtos daphanea, Fauna B. I., Birds, 2nd ed. vol. v, p. 68.

Aquila chrysaëtos hodgsoni Ticehurst, Bull. B. O. C. vol. lii, p. 25, 1931.

This Golden Eagle breeds from Central Asia to the higher ranges of the Himalayas from 8,000 feet upwards, though very rarely under 10,000 feet.

* It seems to me that we should retain this name of Hodgson's, although Ticehurst considers (Bull. B. O. C. vol. lii, p. 25, 1931) that it must be discarded, having been cited by Gray (Cat. Acc. Brit. Mus. 1848) as a synonym of *chrysaëtos*. Hodgson's name is given in Gray's 'Miscellany' (p. 61, 1844) as a name for the Himalayan Golden Eagle, and there can, therefore, be no doubt as to what it is meant for. Gray's later misquotation of it as a synonym cannot invalidate it.

It is a bird of high, wild ranges, great gorges and precipitous cliffs but, so far as we can tell from the little we as yet know of its breeding, it seems generally to select those on which, or in which, there is a certain amount of vegetation—small trees with a precarious hold for their roots in some narrow cleft in rock or cliff-faces, or a scrubby bush or so on a ledge where a certain amount of soil has obtained a lodgment.

Most of the Indian eggs I have seen have been taken from round about Quetta, but the first recorded is that taken by Capt. Unwin at Thandiana, on the borders of Hazara, overlooking the Agrore Valley. He says:—"The nest was placed on a deodar-tree, overhanging a steep precipice. It was about 25 feet from the ground and was composed of a vast number of dried sticks and branches, collected from the neighbouring pine-trees. These were piled up against the trunk of the tree to a height of about 6 feet and formed a platform almost 3 feet in width. It was lined or littered with dry grass and roots. Some Goojars stated that this pair of Eagles had bred in the same nest for the past three years."

Marshall obtained nests in the hills above Quetta and describes them as "enormous structures of sticks built on small trees jutting out from crevices in the faces of cliffs"; and later Williams obtained two others in the same ranges. These he describes as follows (Journ. Bomh. Nat. Hist. Soc. vol. xxxiii, p. 609, 1929):—"This fine Eagle is fairly common in the hills around Quetta. Its call is like a yelping dog and it was this call which attracted my attention to its nest. The nest was placed in a Juniper-tree growing out of a cliff about 300 feet high, and about halfway up. With the help of my shikari and collector and a Brahuh shepherd I managed to get to the nest and recover from it a clutch of two eggs which were well marked.

"The second nest was in a similar position and contained one addled egg and a fledgling. The third nest had two eggs which unfortunately got broken in the old shepherd's efforts to dodge the attacks of the Eagle. He rolled down the hillside about 200 yards, and landed against another Juniper-tree, with a cut leg and torn clothes and the eggs in an omelette. This was the only occasion on which the birds attacked us. Several other nests were located but could not be got at.

"The nests, which were in every case placed in Juniper trees growing on the steep slopes of cliff-faces, were huge structures of sticks and twigs, mixed with rags and skins, the eggs being laid on a nest-lining of grass."

The breeding season is in January and February, Williams's egg and fledgling being found on the 31st March. In the very high hills they breed even later, and a pair of eggs were sent me from Shining in Ladak which were taken on the 18th April, when there was still heavy snow everywhere, at 13,200 feet. This nest was said to have been built on a rock jutting out from a steep hill-face and almost unclimbable.

The full clutch is two always and the eggs are like those of the European Eagle. I have eggs taken in Central Asia said to be of this Eagle, but they are very small poorly marked eggs and, though the data seem good, I cannot help being rather sceptical about them.

The Himalayan eggs are all very fine specimens, not varying much. The ground is a pure white, in one case only faintly tinged with buff, and they are marked with light reddish-brown in fairly large blotches, freckles and small spots, in nearly every pair one egg being more darkly marked than the other. The paler egg in each clutch has very faint secondary marks of pale lavender.

Ten eggs taken in India average 77.1×61.7 mm.: maxima 79.3×63.0 and 77.1×63.8 mm.; minima 76.7×60.0 mm.

Two eggs taken by Wilson and sent to Hume measure 78.7×61.0 and 76.2×61.7 mm., about, and are as big as those in my own series.

Aquila heliaca.

THE IMPERIAL EAGLE.

(1747) *Aquila heliaca heliaca* Savigny.

THE IMPERIAL EAGLE.

Aquila heliaca heliaca, Fauna B. I., Birds, 2nd ed. vol. v, p. 69.

The Imperial Eagle breeds from South Russia and the Balkan countries to Western Asia and Turkestan. Within our limits it has frequently been recorded as nesting in various places in the Himalayas and Northern India, but many of these records are very doubtful, other Eagles, especially *Aquila rapax vindhiana*, having been mistaken for the present bird.

Donald, who knows the Indian Raptores probably better than any other man, alive or dead, writes (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 637, 1919):—"The Imperial Eagle is said to breed freely in the plains of India and in the Himalayas, though it is generally said to be only a winter visitor to this country. Mr. Hume found them breeding in the Upper Punjab, and Mr. Blewitt took a nest in Hansi which undoubtedly was that of the Imperial Eagle, as the female, an adult in the dark plumage, was shot on the nest."

On p. 638 he adds:—"In over 20 years spent in the Himalayas I have never once seen this bird after about May or before September, and will remain very sceptical about its breeding in the hills, even though stragglers may remain to do so in the plains."

Hume thus describes the nests taken by himself in the Punjab on three occasions:—"They lay in February and March, and possibly April; building a large stick platform on or near the tops of trees—peepul-trees in all the instances in which I found the nest. The nests that I saw were from 2 to 2.5 feet in diameter, and some 6 to 8 inches thick, composed of rather small sticks and lined with

a few green leaves. One nest contained two hard-set, another three fresh eggs, and the third only one."

Blewitt's nest, referred to by Donald, was described as "very dense and compact, 7 inches thick by only 18 in diameter; composed entirely of keekur (*Acacia arabica*) and without lining. The nest was placed on the top of a keekur-tree, some 18 feet from the ground, and contained two fresh eggs."

Since Hume's time the only authentic eggs I know of are: two taken in Kashmir on the 3rd April by "mountaineer" (F. Wilson); two taken by Col. K. Buchanan near Dehra Ismail Khan on 26th November, and one taken by Rattray some 20 miles North of Jhelum Cantonments on the 12th April, the female bird being shot off the nest for purposes of identification. The nest taken by Buchanan was a "huge mass of sticks built on a large tree growing in a gorge"; that taken by Rattray was "a large stick-nest in a tree about 30 feet high near river at about 1,000 feet elevation."

In addition to the above I have an egg in my collection which comes from Harrington Bulkley, marked in his handwriting, which was said to have been taken in the "Baluchistan-Sind Hills." This egg was taken on the 19th December and matches many European eggs of this species.

In Europe two eggs seems to be the normal full clutch and rarely three, while in India, though two are sometimes laid, one egg only is also frequently incubated.

In shape the eggs are generally rather broad ovals, less often long and definitely pointed ovals; the texture is coarse and rather rough.

The ground is a dull white, and typically the surface is very scantily spotted and blotched with very pale lavender-grey. In a few eggs the blotches are bolder and darker and, in still fewer, are tinged with reddish or brownish. I have seen no eggs, European or Indian, which could be called handsome, but I have one pair and a single egg which are freely smudged and spotted with reddish-brown. Pure white eggs are rare and, as a series, they are slightly better marked than those of the Indian Tawny Eagle.

Eight Indian eggs average 70.9×54.6 mm.: maxima 76.4×57.4 mm.; minima 66.0×51.1 mm.

Aquila nipalensis.

THE STEPPE EAGLE.

(1748) ***Aquila nipalensis nipalensis* (Hodgs.).**

THE EASTERN STEPPE EAGLE.

Aquila nipalensis nipalensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 70.

This fine Eagle has a breeding range extending from Central Asia, North China, Mongolia and South-East Siberia, South to the North-West Himalayas and, presumably, the hills of Central China.

Under the name of *Aquila bifasciata* Hume records certain notes as to the breeding of the Steppe Eagle, which he links with the true *imperialis* (= *heliaca*), and all seem to refer to this latter bird.

I can find no record to prove that it ever really breeds in India, but I have a clutch of three eggs taken and given to me by J. Davidson which he obtained at Guzerat on the 5th December, 1892, in a "nest, a large mass of sticks and branches high up in a big tree standing alone in cultivation near Hansapur."

These three eggs are broad ovals, one almost pure white, the other two faintly spotted with light brown, one rather more sparingly and darkly than the other two. They measure 67.6×55.0 , 69.4×56.1 and 67.0×53.0 mm.

Aquila rapax (Temm.).

THE TAWNY EAGLE.

(1749) *Aquila rapax vindhiana* Frank.

THE INDIAN TAWNY EAGLE.

Aquila rapax vindhiana, Fauna B. I., Birds, 2nd ed. vol. v, p. 72.

This common Eagle is found over the greater part of the plains of India, but is confined to the drier portions and does not occur in the heavy rainfall countries such as Travancore, the Malabar coast, Eastern Bengal and Assam. It occurs, though not so commonly, in the drier area of Burma in the North Central districts.

So well was the bird and its breeding known in Hume's time that it is impossible to add anything of value to his summary:—

"The Indian Tawny Eagle breeds throughout the drier portions of Continental India. Here this species and the Spotted Eagle may be found breeding in close proximity; but this is only on the borders of their respective territories, and as a rule it is just in these well-drained, open, dry districts, where *A. clanga* never breeds, that the Tawny Eagle most delights to rear its young.

"The nest is always, so far as my experience goes, placed on trees. I have never met with one placed on rocky ledges, although I have found them on trees at the foot of, or near to, precipices, which contained apparently most 'eligible sites.'

"They build a large flat nest of sticks, between 2 and $3\frac{1}{2}$ feet in diameter, and from 4 inches to 1 foot in thickness, according to situation. The nests are generally lined with green leaves, sometimes with straw or grass intermingled with a few feathers, and sometimes have no lining at all. They are generally placed on the very top of the tree, and though I have occasionally found them on peepul- or tamarind-trees, the great majority were on moderate-sized, but dense babool-trees, standing apart or in the midst of fields or low jungles."

The tree selected for the nest varies according to locality. A. Anderson wrote :—"The Wokab is partial to certain trees for the site of its nest ; but I have found its predilection in this respect to be regulated by the abundance or scarcity of the trees in question. In the Cawnpore district they almost invariably build on solitary peepul-trees (*Ficus religiosa*). In the Futtehghurh and Mynpoory districts, where the seesoo (*Dalbergia seesoo*) grows to so gigantic a size, the preference is apparently given to them. Higher up the Doab, where the country assumes somewhat of a desert character, I found them building on thorny acacias. On one occasion I found a nest on a babool which was certainly not more than 15 feet high."

In Jhelum, Jhang and Hissar, in the Punjab, Whistler found them breeding almost invariably on keekur-trees, generally on the extreme top, but once on a side branch well inside the foliage of the tree.

Jones also found them breeding in keekur-trees in the Punjab, but Osmaston took one nest near Rawalpindi 40 feet up in a Mulberry-tree and Lindsey-Harvey obtained one on a solitary Mango-tree.

Whatever the tree selected may be it is nearly always solitary or one of a small group of trees standing in open ground, cultivated or waste, where often the nest is very conspicuous. Anderson writes of one taken by him in January : "I was not long in finding their nest, an enormous structure, on the topmost branches of a seesoo, which was visible nearly a mile off, as at this season of the year the tree was devoid of every green leaf." Occasionally also they may select a tree in a garden, as recorded by Aitken.

The breeding season is a very long one. Hume says "it lays from the middle of November to the middle of June ; but the great majority lay in January. Out of 159 eggs, 83 were taken in January, 38 in December, 28 in February, the rest in November, March, April and June." In the United Provinces and Bihar most birds breed in November and December, and Thompson says that in the Central Provinces also these two are the favourite months. On the other hand Davidson and Wenden in the Deccan took eggs from the 28th October onwards, and had an egg, almost certainly of this species, brought to them on the 30th September.

The normal full clutch of eggs is two, but often one only is laid and rarely three.

In shape they are fairly broad ovals but typically not so broad as those of any of the other Eagles, and rather long ovals are often to be seen, while Hume says that "some are very long and pointed." The texture is coarse but the surface less rough than in that of the eggs of most Eagles, while in a few eggs it is quite smooth and close-grained.

The eggs are white, in all those I have seen pure white, or very occasionally with the faintest possible tinge of pink or yellow, barely discernible. Hume speaks of a greenish tinge, but this I have never seen. A few eggs are entirely unmarked, though this is exceptional. On the other hand, well-marked eggs are even more rare. Most are faintly blotched indefinitely and sparsely over the whole

surface with small blotches of pale reddish-brown. Now and then one comes across a single egg or a pair with darker bolder blotches and spots, yet in my whole series I have only one pair which could be called handsomely marked.

Eighty eggs measured by myself average 66.0×52.8 mm. : maxima 75.1×55.4 and 70.3×57.6 mm. ; minima 58.0×47.3 and 60.0×46.4 mm.

The hen bird alone carries on incubation, but both sexes assist in building the nest, the male bringing the material with which the female does the actual construction. She is said to sit very close when once incubation has begun, refusing to move until the last moment or when stones or sticks are thrown at her. She, however, makes no demonstration on her eggs being taken.

(1750) *Aquila clanga* Pall.

THE GREATER SPOTTED EAGLE.

Aquila clanga, Fauna B. I., Birds, 2nd ed. vol. v, p. 74.

This fine Eagle is found from South and South-West Europe to South Central Siberia and Northern China. South it breeds as far as India. In this latter country it occurs in some numbers, breeding in the North in the better wooded, well-watered areas, while its nest and eggs have been taken as far South as Khandesh by Davidson and Bell. It is common in Sind, though Ticehurst doubts whether it breeds there. Doig never found the nest, but believed it bred in the E. Narra district in November and December.

To the East it occurs and certainly breeds in Bihar and Western Bengal, but though Kloss says that it is found in Winter in Siam and records it from Bangkok and Koh-Lak, there is no evidence that it ever breeds there.

It is a bird which nests only in the immediate vicinity of lakes, swamps, rivers and canals which, as Hume observes, "furnish an abundant supply of frogs, the favourite food of the young." Very rarely only is it to be found nesting in the dry zones. Once Hume obtained a nest "near Jodhpoor," and it has also been found breeding in the driest portion of Bihar. In the hills it breeds here and there all along the lower ranges but is nowhere common. Thompson obtained a nest containing two eggs near Siliguri in the Sikkim Terai. Rattray says that it breeds occasionally in the lower hills of the Punjab, but the only nest he took was about 10 miles from Jhelum.

The nest is the usual Eagle's nest of large and small sticks. Marshall (G. F. L.), who found four nests near Saharanpore, describes one as "a large circular platform of sticks, with a few dead leaves in the egg-receptacle but with no other lining. The diameter of the whole nest was about 20 inches and the interior depth about 2 inches." Sometimes the nest is much bigger, and that found by Thompson measured 2 feet across by about 6 inches in depth.

They are generally placed very high up, sometimes quite at the top of high trees, usually 30 to 50 feet from the ground, while it never seems to build low down in Acacia- and Babool-trees as the Tawny Eagle so often does. The tree selected is generally one of a number standing together in clumps or even in forest but, at other times, great trees with heavy foliage may be selected, standing solitary in cultivated or pasture land.

Hume gives the breeding season as April to June, but Davidson took an egg in Khandesh on 20th February and Rattray another on the 8th March.

In India one egg seems to be the normal clutch, though in Europe two or three are laid. Marshall seems to be the only one in India to have taken two eggs or young from a nest.

The eggs are normally broad ovals in shape, the texture coarse and the surface varying from rather rough to very rough and pimply. The ground is white and Indian eggs seem to be always very poorly marked, sometimes almost unmarked, sometimes faintly freckled with reddish or with small blotches of grey or reddish-grey. European eggs are often quite well marked and sometimes even handsome.

Seventy-two eggs, including fifty-four measured by Jourdain, average 68.3×54.1 mm. : maxima 74.6×55.6 and 74.4×58.0 mm. ; minima 64.5×52.2 and 67.2×51.2 mm.

Aquila pomarina.

THE SMALL SPOTTED EAGLE.

(1751) *Aquila pomarina hastata* (Less.).

THE INDIAN SMALL SPOTTED EAGLE.

Aquila pomarina hastata, Fauna B. I., Birds, 2nd ed. vol. v, p. 75.

This little Eagle is a resident breeding species over the greater part of India and much of Burma. It does not occur either in Sind or in Ceylon, is rare in Travancore and Madras, and is most common in Bihar and Bengal, more especially in the Eastern districts. In Assam it is uncommon, but is found both North and South of the Brahmapootra, while in Burma it occurs sparingly as far South as Pegu.

It is a bird of well-wooded country, generally breeding in trees standing in cultivated country either singly or in small clumps. Occasionally they breed in forest while, on the other hand, both Inglis and Coltart obtained nests built in trees in gardens. They seem to have no special predilection for any special kind of tree. Inglis, who, I fancy, has seen more nests of this Eagle than any two other naturalists, has found the nests in Simul (*Bombax malabarica*), Sissoo, Sâl (*Shorea robusta*), Mango, Pipal (*Ficus religiosa*),

Banyan and others; Bingham found a nest on an immense Babool; Cripps took one from a Tamarind, while Parker found one in the Botanical Gardens on a huge tree the name of which is not given.

The nest, as a rule, is built very high up, seldom as low as 30 feet and occasionally as high as 80 feet, but it is not placed in the extreme top of the tree like that of the Indian Tawny Eagle. In size it varies greatly; I have myself seen one not more than a foot across and only 3 or 4 inches deep, while Unwin records a nest taken by him not far from Abbotabad, "placed on a cheer or fir-tree" which measured "about 18 or 20 inches thick and $2\frac{1}{4}$ feet broad, with a depression of about 3 inches deep in the centre." Most nests I think would average about 2 feet in diameter, or less, by about 6 inches deep, but the birds sometimes occupy the same nest for several breeding seasons, adding to it yearly until it becomes very large.

It rarely ascends the hills to any height, but Rattray once found a nest near Danga Gali in the Murree Hills. In *epistola* he writes:—"I only saw this bird once near Danga Gali. My men came and told me that they had found the nest of a new Eagle and that there was one egg in it. I went with them and saw the nest, which was built in a fir-tree growing out of a ledge in a very nasty place. I stopped on the top of the precipice and sent the man down, and when the old bird flew off and circled overhead I shot it. The single egg was taken on the 7th June and was much incubated."

The birds breed from about the middle of April to the middle of July, the great majority laying in May.

As a rule one egg only is laid, sometimes two, while once Inglis took three eggs from a nest he found in Darhbanga on the 16th May.

Individually I do not think the eggs could be distinguished from those of the Tawny Eagle but, as a series, they are much smaller and decidedly better marked, while many eggs have definite primary markings of light reddish and secondary ones of lilac or lavender-grey. Two single eggs from the Jasse collection are very pretty; one is a pure white faintly blotched and freckled with reddish and profusely blotched with clear lilac. The second is freely freckled all over, but more so at the larger end, with reddish-brown. Some eggs are spotless or nearly so.

Twenty-two eggs average 63.8×49.8 mm.: maxima 66.6×52.6 and 64.7×54.4 mm.; minima 58.5×47.6 and 61.1×47.3 mm.

Davidson records a curious incident in connection with the breeding of this Eagle. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xviii, p. 582, 1908):—"An Eagle's nest was reported to me. When I went to visit it, I found it empty, but an Eagle flew from a very small tattered-looking nest, some 15 yards from the other. I shot the bird (now in the South Kensington Museum) and she contained a shelled egg which was broken by the shot. The nest contained a single fresh egg. I found beneath the original nest the remains of a broken Eagle's egg. At the time I considered that

owing to wind or owing to some disturbance the egg had fallen from the nest, and that she had consequently deserted and taken possession of a previous old nest to lay again. The circumstances, however, might quite be that, being disturbed by the man who had told me of the nest, she had tried to move her eggs, and dropped one in so doing."

Hieraëtus fasciatus.

THE SLENDER HAWK-EAGLE.

(1752) *Hieraëtus fasciatus fasciatus* (Vieill.).

BONELLI'S, OR THE SLENDER, HAWK-EAGLE.

Hieraëtus fasciatus fasciatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 77.

Bonelli's Eagle is found over the whole of India, breeding both in the plains and in the Himalayas to an elevation of at least 8,000 feet. I have never met with it in Assam, but it extends East into North-West China. Outside India it is found practically throughout Southern Europe and East through Asia Minor and Palestine to Central Asia.

In the South it breeds in some numbers in Travancore, where Stewart took many nests; Davidson and Wenden and Sparrow obtained nests in the Deccan as well as in Khandesh, and it breeds here and there throughout Northern and Central India, ascending the Himalayas to about 7,000 feet and perhaps higher. In the North-West Rattray found a nest above Kohat at 4,500 feet*, Dodsworth took a nest in the Patiala State at 6,000, Hutton, Mackinnon and Ollenbach have taken them about Mussoorie; Cock found one near Dharamsalā and many collectors have found them breeding in the United Provinces. In Burma Hopwood took a nest near Sagaing and Macdonald another near Pakokku, while Wickham records two nests in the Southern Shan States built on crags, one quite inaccessible. The first nest found contained fully fledged young in April.

Normally in the hills and also in the plains where the rivers have huge banks and where there are other suitable places the birds make their nests on ledges of earth or rocky cliffs and precipices, but in Southern India they almost invariably build on lofty trees. In the Nilgiris Miss Cockburn saw one nest on a "ledge in the face of a precipitous cliff," while on the other hand Whymper in the North found one on a tree, though others obtained by him were on ledges on the "mud-cliffs of the Jumna River."

Hume gives a description of the nest which covers all that can be said:—"The nest, commonly placed on some convenient ledge or recess in the cliff's face, is very large, from 4 to 6 feet in diameter,

* This is described as a nest of *S. nepalensis*, but the birds were later identified as of this species (Journ. Bomb. Nat. Hist. Soc. vol. xxii, p. 800, 1914).

and is composed of thickish and moderate-sized sticks, varying from 1.5 to 0.5 inch in diameter. The nest itself varies in thickness from a few inches to a couple of feet, and being always finished off to a level, when placed, as often happens, on a more or less shelving declivity, is much thicker exteriorly than interiorly. In the nests that I have examined branches and twigs of various kinds of thorny acacias were the chief materials used. In no nest that I have seen, not even in that one found on a peepul-tree, was there any depression in the interior of the nest. In the centre of the platform a circular space, of some 18 inches in diameter, is commonly smoothed over with a layer of green twigs; and in the centre of this again a smaller space of perhaps one foot in diameter is carpeted with green leaves, those of the neem, peepal, and peeloo (*Salvadora persica*) and other trees being apparently made use of."

In some nests there is a slight depression for the eggs to lie in, and in such cases this is lined as described by Hume, though occasionally the leaves are dispensed with.

When placed on trees they are generally built on very large ones at great heights from the ground but, when placed on ledges of cliffs, they are sometimes quite easy to get at, as when built on the banks of the Jumna, and at other times quite unapproachable.

Thompson says that in Kuman and Garhwal "they are always placed in the most inaccessible precipices," and Hutton also records that in Mussoorie "though we have several times found the nest, we could never get at them."

Occasionally, even in the mountains where precipices abound everywhere, the birds use a tree as a site for the nest, the one found by Cock at Dharamsala being on a cheel-tree (*Pinus longifolia*) at the edge of a very lofty precipice.

In Sind, where this Eagle breeds both on cliffs and on trees, Ticehurst remarks that (Ibis, 1923, p. 250) "sometimes old Tawny Eagle's or White-headed Vulture's nests are appropriated. They were situated, like others I have seen, at the top of a tall tree in jungle, and I may add often in a tree in inundation."

The principal breeding months are December to February. Hume says that he believes that they sometimes lay as late as April in the Himalayas, whilst in Kuman and Garhwal Thompson gives April to June as the breeding season. Personally I have no records of eggs being found later than the 23rd February in plains or hills, and Thompson was probably mistaken.

The usual clutch consists of two eggs, but Hume once found three, and often one egg only is incubated.

The texture is much the same as that of the Tawny Eagle, while the shape is generally a broad oval, rarely a long and pointed oval. The colour varies from a white, almost immaculate or faintly blotched with pale reddish or neutral tint to white boldly blotched with pale brown or reddish-brown, with secondary and fewer similar blotches of grey and neutral tint. Hume says he has seen

no egg that could be called handsome, but I have seen one such pair from Burma and several from Spain.

Forty-six Indian eggs average 69.1×53.4 mm. : maxima 72.2×53.1 and 69.9×56.9 mm. ; minima 65.0×54.1 and 66.8×51.2 mm.

Both sexes assist in making the nest, the male bringing and the female arranging the materials. The female alone incubates and sits very close, refusing to move until the climber is close to her or until some missile actually strikes her. I have, however, never heard of male or female attacking any one robbing the nest.

(1753) *Hieraëtus pennatus* (Gmelin).

THE BOOTED EAGLE.

Hieraëtus pennatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 70.

The Booted Eagle is found over the greater part of Southern Europe, Northern Africa and Western Asia to North-West India, but in India it apparently rarely breeds, though as a visitor its range extends into Burma and even the Malay Peninsula. Wickham also records its occurrence in Burma but did not succeed in finding the nest.

So far as India is concerned the Booted Eagle seems to haunt pine- or other forest on steep mountain-sides for nesting purposes, the only exception to this being a nest found by Osmaston at Srinagar near the top of a huge Chenar-tree, 120 feet from the ground.

The other nests found with eggs are only three in number. First, Theobald, one of Hume's collectors, obtained a nest at Salem on the 27th February containing two eggs. The nest is said by Theobald to have been built "on a branch of a high banyan-tree (*Ficus indica*) about 40 or 50 feet from the ground. It consisted of dry twigs and was in shape a circular platform, with a slight depression in the centre, devoid of lining."

In 1905 Rattray secured a nest with one of the parent birds near Murree, at an elevation of about 8,000 feet, containing two very hard-set eggs, on the 20th March. Of this nest he writes to me: "The nest was in a tree growing out of the face of a steep rock-cliff; it was large, and made of twigs and pieces of stick."

Next, in 1912 Whitehead found a nest which he records (*Journ. Bomb. Nat. Hist. Soc.* vol. xxii, p. 108, 1914): "A nest was found at 10,000 feet (above Kohat) on 22nd June. It was a huge platform of sticks lined with green pine-needles on the top of a blue-pine (*Pinus excelsus*). It contained a single plain white egg. There were two holes, and the contents were nearly dried up. However, the female was still incubating it. As I could not satisfactorily identify her I was obliged to shoot her" (the skin is now in the British Museum).

In addition to Osmaston's nest, already referred to, Ward told

me that Crump had come across a nest with eggs in Kashmir, I believe near Gundabal.

I have also an egg in my collection said to have been taken in the Shan States on 14/4/14, but I can find no further details about this. Some very faint pencil writing on the egg seems to be in Harington's hand.

All the Indian-taken eggs are white or white very faintly and sparsely flecked with reddish or grey at the larger end, but some European eggs have been found quite well freckled or blotched with reddish.

Six Indian eggs average 56.7×44.2 mm.: maxima 62.3×50.8 mm.; minima 51.9×42.0 mm. Jourdain gives the average of 138 European eggs as 55.5×44.8 mm.

***Lophotriorchis kieneri*.**

THE RUFOUS-BELLIED HAWK-EAGLE.

(1754) *Lophotriorchis kieneri kieneri* (de Sparre).

THE HIMALAYAN RUFOUS-BELLIED HAWK-EAGLE.

Lophotriorchis kieneri, Fauna B. I., Birds, 2nd ed. vol. v, p. 80.

This grand Eagle is found in suitable places from the lower Himalayas to Ceylon, while West to East they occur from Kuman to Siam, where Gairdner shot a single specimen. They are also sparingly distributed throughout Burma, the Malay States and many of the Malay Islands to the Philippines.

It is not rare on the West coast of India in Malabar and Travancore, especially in the latter country between 1,500 and 3,000 feet. In the Himalayas it ascends as high as 5,000 feet.

Wherever found it is almost certainly resident and breeds, but very little has been recorded about it. It is a bird of forest, preferentially of dense deciduous forest, but often, as in Assam, of humid evergreen forest with thick tangled undergrowth, where even the greater trees are so matted with creepers, orchids and other parasitical plants that passage through them is difficult.

Stewart, Dobson, and a Mr. Ross, who collected for Stewart, are, I believe, the only collectors who have ever taken the eggs of this bird, though A. M. Kinloch obtained a nest from which he took a young bird in the Anamallai Hills in December 1906 (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 1027, 1907). Stewart, who took many nests and eggs of this Eagle in Travancore, has sent me many notes together with a fine series of the eggs. The notes may be summarized as follows:—The Rufous-bellied Hawk-Eagle breeds in Travancore at all heights from 1,000 feet to 4,000 feet, but principally between 1,500 and 3,000 feet. Most birds undoubtedly breed in dense deciduous forest of enormous trees, sometimes with hut little

undergrowth, but often where it is very dense. At other times the nest may be found in evergreen forest, more especially in the higher ranges above 3,000 feet. Wherever it breeds the tree selected is invariably one of the largest and the nest is often 80 or 100 feet from the ground and very seldom under 50. One would expect such nests to be very conspicuous, and so they are when one is close by, but the forests are so vast and the birds, each pair, control so great an area that it is no easy matter to locate them and, even when found, one's task is by no means finished. Probably the nest will be seen high up on some forest giant, unclimbable without much time and trouble. If bamboos are growing near by and you have hillmen with you, a strong ladder will soon be made, pegs driven into the tree forming the rungs, while the tree on the one side and long bamboos on the other form the supports. Before, however, the upper parts can be completed the Eagles have to be driven off. Again and again, Stewart writes, "the birds had to be shot at repeatedly before the man could reach the nest," while, sometimes much against his will, one or even both parents had to be shot. According to Stewart they are the fiercest and beldest of all Eagles, even more obstinate than the Crested Hawk-Eagles, and more relentless in their attacks.

The nests are large platforms of sticks, which are of considerable size, measuring a couple of feet long and anything up to near 2 inches in diameter. The lining is of green leaves or of green twigs with the foliage attached, and Stewart thinks that these are renewed from time to time as incubation advances.

The nests themselves vary a good deal. New ones may not measure more than 2 feet in diameter by a few inches deep, but the birds use the same nests for many years, adding to them constantly, so that they get bigger and bigger until occasionally they may be nearly 4 feet across and 2 feet deep.

As with some of the other *Raptores*, these Eagles often have two nests which they use either in alternate years or, as the spirit may seize them, for the time being. If the nest is robbed they nearly always leave it the following year, but may again resort to it a year or two later. As already mentioned, these Eagles hold sway over very great "territories," and the two nests are sometimes as much as 2 miles apart. Once the eggs are laid one bird seems to be always present close to them, and the male does definitely take a share in the incubation and is as brave and determined as his wife in protecting his belongings.

Dobson obtained his two nests about 25 feet up in smallish trees in a patch of jungle in Dikoya, a tea district in Ceylon, at an elevation of about 3,000 feet.

The breeding season lasts from December to March, and eggs have been taken by Stewart from the 27th November to the end of March, while Dobson took the eggs on the 13th and 31st March.

Only one egg is laid and I have no record of two. They range from white with the faintest suggestion of red freckling to white quite densely blotched with pale reddish-brown primary and lavender-grey secondary markings. Very few eggs could, however, be called handsomely marked and most are very poor specimens of Eagles' eggs.

The texture is coarse, the surface rather rough and the shape generally a broad oval, sometimes very spheroid, rarely rather longer, but always blunt, not pointed, at the smaller end.

Nineteen eggs average 61.2×48.1 mm.: maxima 66.1×49.2 and 65.1×50.9 mm.; minima 53.8×44.9 mm.

Ictinaëtus malayensis (Reinw.).

THE BLACK EAGLE.

(1755) *Ictinaëtus malayensis perniger* (Hodgs.).

THE INDIAN BLACK EAGLE.

Ictinaëtus malayensis perniger, Fauna B. I., Birds, 2nd ed. vol. v, p. 83.

No addition has been made to the range of this bird since the 'Fauna' was written. It is resident in the Himalayas from the Murree Hills to Eastern Assam, Bengal and Chota Nagpur. It is a rare straggler into parts of Burma and has been recorded from Perak and Malacca in the Malay Peninsula. Like so many other birds from the wet North-East of India it is also found on the South-West coast of India from Kanara to Cape Comorin, and Jerdon states that he has seen it in the Eastern Ghats and in Bastar in Central India.

The Black Eagles frequent evergreen, humid forest at all elevations from the plains up to nearly 8,000 feet, but principally between 1,000 and 4,000 feet. In Travancore Stewart took eggs between 1,000 and 4,000 feet, while I took an egg in North Cachar at 5,500 and a second in the Khasia Hills at about 4,000 feet. The egg I took in North Cachar came from a typical nest of this Eagle, except that it was larger than usual. I quote the description I gave of it (Ibis, 1918, p. 52, pl. xi.):—"The nest was a huge affair of sticks lined with green leaves, and was placed high up in a large tree in deep evergreen forest at an elevation of about 5,500 ft. Like all other nests which I have seen, this one was built on a tree growing in very rugged country, but was not particularly hard to get at owing to the tree being covered with a network of the 'Elephant-Creeper' and other plants which made climbing it an easy matter. The tree itself grew on the side of a very narrow ridge, joining two hills together, and forming a narrow bridle-path, three or four feet wide, which zig-zagged its rocky and difficult way from one Naga village to another. Looking over the edge of

this path, on one side one could see through the straggling tree-tops into a depth below of many hundreds of feet, the drop being almost sheer, the trees seeming to hang on by their roots, in the most precarious way, between jutting boulders and rocks. On the other side, though not quite so sheer, the cliff fell away very precipitously, yet holding enough soil to encourage a dense growth of oaks and other trees. Fortunately it was on this side of the ridge that the Black Eagles had selected a tree on which to build their nest, and climbing down the rocks we were soon at the foot of the tree and in another five minutes I was up to the nest.

"Up to this point in the proceedings the parent birds had taken but little interest beyond wheeling round and round the tree and uttering their shrill and rather melancholy call. As, however, I got to the nest both birds swooped down time after time within a few feet of me and once, indeed, the female almost struck me in passing. Leaving the egg I then descended and, before I was half-way down, the female was back again on her nest and crouching over her egg.

"Later when I returned to take the egg the birds were much fiercer, and commenced their attacks directly I began to climb the tree, so that after once trying to get up I had to come down and shoot the female before again attempting to tackle the nest. Both birds swooped at me repeatedly, but the female again and again came within inches of my head, whereas the male never came nearer than two or three feet. A fall at that height would have meant certain death and it would have been quite impossible to carry the egg down and at the same time protect oneself, so that the murder of the parent bird was absolutely necessary.

"The nest must have been over four feet in diameter and about 18 inches deep, with a well-made depression in the centre lined with a pad of green leaves and the ends of green branches. The leaves were nearly all those of the 'Elephant Creeper' and so large that it only took about a dozen to make a thick, cool pad. The branches were just the tips of oak twigs with the green leaves adhering.

"In the body of the nest the sticks were of considerable size, some of them fully an inch in diameter and many of them over three feet in length. Most of these appeared to be dead sticks and branches either picked up by the birds off the ground or torn off dead boughs. The sticks which were on the upper part were much smaller and more pliant and seemed in some cases to have been torn from living trees.

"The male secured another partner within a very short time of the death of his wife, and in the subsequent years built a nest on the opposite side of the ridge, where they were quite safe from molestation, for though we could see it well enough, we could not get at it."

The above gives a very good general idea of the majority of nests

and of the bird's behaviour, except that I have never seen another nest so big as this. All the birds seem equally brave. Stewart says it is difficult to take an egg until one or both the birds are shot.

Rattray, who obtained one egg at Danga Gali in 1904, said that the birds repeatedly attacked his climber and eventually he had to shoot one of the pair before he could take the egg.

Among other eggs of this bird which have been taken was one found by Parker on the 13th April, 1883. By some mistake the egg and the bird, which was shot off it, were marked *Spilornis rutherfordi* but the bird, which I saw after Parker's death, was a Black Eagle. Possibly tickets were wrongly affixed, being interchanged between this and a Serpent-Eagle.

Stewart took a wonderful series of this bird's eggs in Travancore, and while his notes generally endorse my description they add considerably to it. He says that, like *Lophotriorchis*, this Eagle has generally two nests, often some miles apart, and that they resort to the one or the other for no particular reason, and that he has known a bird lay again in a nest from which an egg had already been taken although it had a second nest available. Some years the birds do not breed at all, and Stewart writes of one pair that they began to repair a nest in October but, after hanging about it for months, never laid at all. Before letting his climbers go up to a nest he had always to pepper the birds with small shot and sometimes had to kill them outright to prevent his men being injured. If one of a pair was killed the survivor always seemed to find a mate at once and, though they might use their alternative nest for a year or two, they would return to the other eventually.

Stewart obtained nests in trees which were so densely covered with creepers that in spite of their size they were difficult to detect, and others in trees almost bare in which the nest was conspicuous from a great distance. With one exception he never saw a nest in any position other than in trees, but once he took an egg from a nest built "on a crag." This would seem to show that the eggs sent to Hume and said to have been taken from nests built "on ledges on the face of cliffs" may have been correctly identified. One of these was taken at Kooloo, the other at Bussahir. Parker's egg, it should be noted, was laid in a nest in a tree at Kooloo, and was taken on the 16th April, but this egg was very hard set, while Hume's eggs were found on the 4th and 7th January.

The normal breeding season is November to February, while Stewart took an egg on the 9th September but, on the other hand, I obtained a perfectly fresh egg in the Khasia Hills on the 2nd May; Rattray also took one on the 4th of that month, and again Buchanan found a nest with a fresh egg 10 miles from Murree on the 29th April; the season seems to be very irregular and protracted.

As a rule one egg only is laid and Stewart has only thrice taken two, a number found by no other collector except the gentleman recorded by Hume who took one clutch of three.

The eggs of this Eagle, are, in my opinion, the most handsome and most varied of all our Indian Raptores except, perhaps, those of the Indian Honey-Buzzard. It is only possible to describe them by taking individual eggs. The most usual type has the ground white to creamy white, with primary blotches, spots and specks of rich vandyke-brown, the majority of the blotches hold, irregular and large, some measuring as much as 25×15 mm. Here and there are specks of an almost black-brown; the secondary markings, few in number, consist of specks and small blotches of pale sienna. A second type is similar to the foregoing but is altogether paler and less richly marked with earth-brown, tinged here and there with grey or purple. A third type has the ground a pale cream with primary specks, spots and small blotches of rich vandyke-brown and blackish, while the secondary markings of lilac and lavender-grey form mottling or clouding over the whole surface, contrasting with the deep-coloured primary blotches. The marbling coalesces to form a broad ring round the upper third of the surface. Here and there, in addition to the others, there are a few smears of reddish-brown. Yet a fourth type has the ground light reddish-ochre or pink brick-red, the markings varying from faint blotches of a deeper shade of the same to deep brick-red clouds and smears with underlying marks of grey and lavender. Intermediate forms may be seen but are exceptional, while poorly coloured eggs still more so.

In shape the eggs are very constant, broad ovals, the ends almost equirounded. The texture is coarse and not close, but the surface varies from dull to almost smooth with the faintest gloss.

Twenty eggs average 62.7×49.9 mm.: maxima 65.0×50.1 and 63.4×51.2 mm.; minima 55.0×43.0 mm. The latter might be considered abnormal, my next smallest egg being 58.7×48.8 mm.

Nisaetus * *cirrhat*us.

THE CRESTED HAWK-EAGLE.

(1756) *Nisaetus cirrhat*us *cirrhat*us (Gmelin).

THE INDIAN CRESTED HAWK-EAGLE.

*Spizaetus cirrhat*us *cirrhat*us, Fauna B. I., Birds, 2nd ed. vol. v, p. 85.

*Limnaetops cirrhat*us *cirrhat*us, ibid. vol. viii, p. 685.

The distribution of this Hawk-Eagle embraces practically the whole of the Indian Peninsula, North to Etawah, in the Punjab, and to Western Bengal; South it is replaced in Southern Travancore by the next race, *ceylanensis*.

* In creating the name *Limnaetops* for the genus formerly known as *Spizaetus* (really an American group) I unfortunately overlooked *Nisaetus*, which is applicable to our Indian genus (Hodgs., Journ. Asiat. Soc. Beng. vol. v, p. 229, 1876. Type by orig. design. *Nisaetus nipalensis*). Kirke-Swann considers *Spizaetus* and *Nisaetus* congeneric.

Although this is a very common Eagle in the South-West of India, where Davidson and Vidal took many nests and eggs, there is not much on record about their breeding. Both these gentlemen sent eggs and notes to Hume, which are recorded in 'Nests and Eggs.' These notes, together with others from Vidal's note-books, may be summarized as follows:—They breed both in forests and in more open country which is well wooded. According to Thompson they select trees "in some good game country," but often in places where there is little or no game from the sportsman's point of view, though there may be ample from that of the birds. They do not mind what tree they nest in provided these are big enough to enable them to place their home at a considerable height from the ground. Mango-trees, whether solitary or in orchards, are undoubtedly the favourites, but nests have been found in Banyan (*Ficus indica*), Peepul (*F. religiosa*), Tamarind, Hora (*Dipterocarpus*), Cypress and in many other species. They do not, however, nest in the Acacias and small thorny trees so often selected by the Tawny Eagle. Most nests are over 40 feet from the ground and many far higher even than this.

The nest is large; the only dimensions given are for one of Vidal's, "over 3 feet across and very deep, about 18 inches," but they are always described as "large," "very large," "huge" etc. They are built of sticks, branches and twigs, the larger of these being used for the outer part and base, the smaller for the inner part and for the construction of the egg-chamber, which is usually deep. The actual lining is of green leaves, and those most often used are Mango-leaves, probably because of their thickness retaining moisture more than others. The material seems to be generally rather untidily and loosely put together, the ends of the sticks hanging down and protruding from the mass in all directions.

The principal breeding months are January, February and early March, but eggs have been taken from the middle of November to the end of April.

Vidal thought the bird very shy, deserting the nest on very little provocation, but Davidson found just the contrary and from one nest took an egg on the 9th March, hard set, and another slightly set on the 23rd April.

Only one egg is laid and there is no record of two young or eggs.

The eggs are white, though very seldom quite unmarked. Most are feebly speckled or faintly blotched with light reddish at the larger extremity, while occasionally they are marked sparingly over the whole surface or at the smaller end only. I have also seen one or two eggs minutely speckled at the larger end with deep purple.

The texture is coarse, the surface rather rough and never glossed. Thirty-nine eggs average 67.3×51.9 mm.: maxima 71.1×52.2 and 71.0×52.8 mm.; minima 65.3×49.9 mm.

Both sexes assist in building the nest but there is no evidence that the male ever takes part in incubation. They are cowardly birds

and never make any demonstration even against robbers of their eggs or young, flapping lazily away to some distant tree as soon as they are disturbed.

(1757) *Nisaetus cirrhatus ceylanensis* (Gmelin).

THE CEYLON CRESTED HAWK-EAGLE.

Spizaetus cirrhatus ceylanensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 86.
Limnaëtus cirrhatus ceylanensis, ibid. vol. viii, p. 685.

This small form of *Nisaetus* is confined to Ceylon and to the South of Travancore, where Stewart found it to be very numerous.

In Ceylon Legge records that "it breeds in February and March in the forests of the Southern Province of Ceylon, building in the former and hatching its single young one about the middle of the latter month. It selects a tall forest-tree, generally a *hora* (*Dipterocarpus zeylanica*), and constructs a massive fabric of large sticks in a fork near the top. I have never heard of more than one young bird being reared."

Stewart and Bourdillon, the former of whom took many nests in Travancore, describe the nesting as exactly like that of the typical form. Stewart records finding nests from the foot-hills up to about 2,500 feet, generally built on huge forest-trees standing in both evergreen and deciduous forest. The birds are very cowardly and make no attempt to defend their eggs against human beings, but they are very hard to drive from their nests, and Stewart on one occasion took three eggs, one after another, from the same nest, yet the bird still returned to it even after the third had been taken.

Only one egg is laid, generally in January and February, but Stewart has taken eggs from early December to the end of March.

The eggs cannot be distinguished from those of the Indian race hut, as a whole, are even more feebly marked.

Twenty-four eggs average 61.3×49.8 mm.: maxima 70.3×50.6 and 62.8×54.1 mm.; minima 57.5×45.1 mm.

(1758) *Nisaetus cirrhatus limnaëtus* Horsf.

THE CHANGEABLE HAWK-EAGLE.

Spizaetus cirrhatus limnaëtus, Fauna B. I., Birds, 2nd ed. vol. v, p. 87.
Limnaëtus cirrhatus limnaëtus, ibid. vol. viii, p. 685.

This race of Hawk-Eagle takes the place of the typical form over the sub-Himalayan Terai from Garhwal to Eastern Bengal and Assam, breeding from the plains up to an elevation of about 6,000 feet, though more often between 1,000 and 3,000 feet.

In Hume's 'Nests and Eggs' there are records of this bird's breeding in Samnuggar (Parker), Thayetmyo (Feilden) and Furreedpore (Cripps). Since then Whympers has taken eggs in Kuman,

Hopwood and Mackenzie in the Upper Chindwin and Arakan, and the writer in the Assam Hills.

Thompson's notes probably refer to some other Eagle, and I do not quote them. The site selected by the birds for their nest is quite typical of the species; high up, 40 feet or more, in some great tree either in forest or in the open, but nearly always beside a stream, small or big. Feilden, who found many nests, says that they select a site "in the fork of the largest and most inaccessible tree they can find, invariably, so far as I know, overhanging the bed of a stream." Hopwood, who also took several eggs, endorses this, while the only nest I have personally found was built about 40 feet up in a huge tree in forest, standing on the bank of a tiny stream. A nest taken by Parker was built "on a mango-tree, one of a rather scattered group growing in the old mud-forts in Samnugger on the E. B. Railway, close to a cart-track through the forest." Cripps found a nest in a still more unusual place, *i. e.*, on a tree in the middle of a small market-place near a factory.

The nest is quite typical, a platform of large sticks, finished off with smaller twigs and branches and lined with green leaves. The depression for the eggs is said generally to be shallow, but in the nest found by me it must have been nearly 6 inches deep, the nest itself being about $3\frac{1}{2}$ feet across by over 1 deep.

The lining is invariably of fresh green leaves, sometimes mixed with twigs to which the leaves still adhere. This lining seems to be renewed from time to time until the eggs are hatched. Under the only two eggs I have taken—both from the same nest—were quite fresh leaves, though the eggs were slightly set. The nest is said to be rough and untidy and rather carelessly put together.

The nests are used for many consecutive years; the one from which I obtained my eggs was said to have been in existence for twelve years, and the birds were still there, four years later, when I left the district. Two years running I took the first egg laid on the same date, the 14th January, and each year the bird laid again and hatched and brought up the young one.

These Eagles sometimes start laying in December, but the principal months are February and March, while a few lay in April.

The eggs are quite typical; one only is laid, and it cannot be distinguished from those of the other races, though they average larger.

Sixteen eggs average 69.8×51.9 mm. : maxima 74.1×55.6 mm. ; minima 62.0×51.2 and 67.0×48.2 mm.

(1759) *Nisaëtus cirrhatus andamanensis* (Tytler).

THE ANDAMAN HAWK-EAGLE.

Spizaëtus cirrhatus andamanensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 88.
Limnaëtops cirrhatus andamanensis, *ibid.* vol. viii, p. 685.

This little Hawk-Eagle is confined to the Andamans, where it is not very rare, having much the same breeding habits as its bigger

cousins, though, so far, Osmaston is the only collector to have taken its egg.

Osmaston describes the nest as fairly large, made of sticks and lined with green leaves from a Jaman-tree. The nest was in a Teak-tree about 30 feet from the ground, and contained on the 21st January a single egg. The nest was found at Haddo, near Port Blair.

The egg is quite a typical one of the genus, nearly white with a few very faint freckles; in shape a broad, blunt oval, measuring 62.2×50.1 mm., and having texture and surface as in the eggs of the typical race.

***Nisaetus nipalensis*.**

THE FEATHER-TOED HAWK-EAGLE.

1760. *Nisaetus nipalensis nipalensis* Hodgs.

THE NEPAL FEATHER-TOED HAWK-EAGLE.

Spizaetus nipalensis nipalensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 89.
Limnaetops nipalensis nipalensis, *ibid.* vol. viii, p. 685.

The breeding range of this fine Eagle is all along the Himalayas from Hazara to Eastern Assam, both North and South of the Brahmaputra. It extends into the Plains and breeds sparingly there and, according to Osmaston (A. E.), regularly in the Gorakpur district in the North-East of the United Provinces (Journ. Bomb. Nat. Hist. Soc. vol. xxii, p. 557, 1902). In 1910 he obtained a nest with the usual single egg high up in Sâl-tree. Normally I think it breeds between 2,000 and 7,000 feet, and Donald says that it breeds "in suitable localities all over the Himalayas between 6,000 and 8,000 feet" (*ibid.* vol. xvii, p. 825, 1907).

Whymper took many nests of this Eagle in Kuman, and his interesting notes to me, sent in letters and with data for eggs, include nearly all that can be said about the nidification. These Eagles are birds of forests, both deciduous and evergreen, and seem to have a special fondness for the tallest trees growing in forest by streams. Donald says that a favourite tree is a large Deodar in a clearing standing by itself, with a few dead trees close by, and surrounded by forest. He also notes that he found the nests almost invariably on Deodars, but Jones found one on a Bastard Oak (*Quercus dilatata*), Buchanan one on a huge Pine, while Whymper took nests in "saj" and other species of trees. The nest is nearly always at a great height from the ground, generally over 40 feet and sometimes 80 feet or more. The nest itself is quite typical of the genus, a great mass of sticks and twigs with a definite depression for the egg, which is invariably lined with green leaves, large and thick leaves being preferred, though occasionally smaller leaves and green twigs are employed. The nests

are untidily put together but are compact and strong, being used for many years, not necessarily every year, as some birds have alternative nests, using sometimes one sometimes the other. Unlike the birds of the *cirrhatus* group, which are cowardly, the Nepal bird is exceptionally fierce and bold. An instance is narrated by Whympers as follows :—" *Spizaetus nepalensis* nearly deceived us this year by leaving the old nest and fiercely attacking a man who went up to it. As they had done nothing at all in the way of repairs to the old nest, after thinking it over I came to the conclusion they must have another nest near by. We returned another day and found a nest 400 yards away up the nullah, and got a lovely egg from it. We had a tremendous battle. As I did not want to shoot her we armed ourselves with plenty of throwing sticks, and I nearly knocked her over with one, but she did not mind and attacked eight times. Once my man up the tree hit her such a whack with his fist that it lifted her right up in the air, but in spite of this she wheeled round and took his cap off, wounding him in the head. They are the bravest birds I have ever seen, and the speed with which they attack must be seen to be believed; they start from a tree several yards away and come on straight as a dart." On other occasions he notes: "The bird attacked the climber most savagely, and I had to pepper her to drive her off"; and again, "the bird attacked, tearing the man's clothes and wounding him on the hand."

In spite of being "peppered" with shots the birds never seemed to desert the nests, and were found breeding in them year after year.

The breeding season is in February and March, but Jones took one egg from a nest on the 24th April, while Whympers took another as late as the 15th May. Only one egg is laid.

The eggs of this bird are not often like those of the *cirrhatus* group. Occasionally one may be practically pure white, but the majority are of two types: first, pale clay or reddish-white, profusely stippled all over with rather darker red and with here and there small blotches of still darker red or red-brown; these eggs are very like small eggs of a common type of Bearded Vulture's eggs. Secondly, pure white, handsomely and sometimes profusely blotched and spotted with rich red at the larger end, the spots being scanty elsewhere and absent at the small end.

Sixteen eggs average 69.9×53.8 mm.: maxima 72.7×54.4 mm.; minima 65.0×51.2 mm.

In this particular species and race the male bird seems to do little beyond bringing the material for the female to build or repair the nest. He generally keeps—at all events during the heat of the day—somewhere near where the female is sitting, but there appears to be no instance recorded of his assisting the female in attacking intruders.

(1762) *Nisaetus nipalensis kelaarti* Legge.

THE CEYLON FEATHER-TOED HAWK-EAGLE.

Spizaetus nipalensis kelaarti, Fauna B. I., Birds, 2nd ed. vol. v, p. 91.*Limnaetops nipalensis kelaarti*, ibid. vol. viii, p. 685.

This Eagle is confined to Ceylon and the South-West ranges of hills from the Nilgiri and other ranges in Mysore down the Malabar coast to Travancore.

Dobson has taken its nest once in Ceylon at an altitude of about 4,000 feet but, with that exception, Stewart appears to be the only person ever to have taken eggs and nests. Most of his nests were taken between 1,000 and 3,000 feet on the Travancore hills in dense evergreen virgin forest, and only occasionally in deciduous forests where the trees grow to an immense size and there is considerable undergrowth. Apparently the birds have not the same affection for the vicinity of water shown by the Northern race, but one or two nests are said to have been taken from trees "close to streams" and one "on the banks of a forest stream." The nests are built at a great height from the ground and the labour entailed in getting up to them is immense, clever as the hill tribes are in constructing spike and bamboo ladders. Dobson writes of his nest being 100 feet from the ground in a tall Gum-tree, while Stewart found a nest "over 100 feet from the ground in a Cotton-tree," another "over 80 feet from the ground in huge, densely foliated tree," and again, "at least 100 feet up in a mighty forest tree near a stream."

The nests are, of course, just like those of true *nipalensis*, great structures of sticks and branches lined with green leaves and, like *nipalensis*, this Hawk-Eagle often has two nests, using sometimes the one sometimes the other.

Unlike *nipalensis*, however, this bird does not show savageness and extreme pluck in the defence of its eggs or young. It is not such a coward as *cirrhatius* but, after a few half-hearted swoops, seldom very close to the would-be robber, the birds generally desist and fly away. If an egg is taken the female will occasionally lay again either in the same nest or in her alternative one, and no amount of robbery seems to drive her away altogether.

The breeding season lasts from early December to the end of March, though most eggs are laid in January. The usual single egg is laid, never more.

In appearance the eggs are very like those of *cirrhatius* and vary from pure white or grey-white, which is unusual, to the same lightly freckled or speckled with reddish. A few eggs are marked with large smears or indefinite blotches of pale reddish but Stewart has taken none handsomely marked like those of *nipalensis*.

Thirty-two eggs average 60.1×54.6 mm.: maxima 73.4×55.2 and 68.9×56.0 mm.; minima 65.3×54.8 and 68.1×53.3 mm.

(1764) *Circaëtus galliens* (Gmelin).

THE SHORT-TOED EAGLE.

Circaëtus gallicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 93.

The Short-toed Eagle has an immense breeding range, being found from South-West Europe and Northern Africa as far East as Northern China. In India it occurs over practically the whole continent as far East as Eastern Bengal, though I never saw it in Assam and it does not occur in Ceylon. It has been reported occasionally from Siam and once from the Malay Peninsula.

Wherever found this appears to be an Eagle of open country but equally so of dry, arid areas and wet, well-cultivated country. It is not, however, found in treeless regions and prefers well-wooded country even if dry. In Sind Ticehurst says that it is resident but keeps to the better-wooded parts. In Kuman and Bengal it does not frequent the wet humid forests but keeps to the open waste or cultivated country. Thompson says that it "breeds in the Garhwal forests," but also says that the nest is "usually on the highest branches of a tall tree, in a moderately wooded country, and mostly in one standing by itself." In the Futtegarh district A. Anderson certainly found two nests in forest, but he describes the forest as thin scrub with small thin trees and very open.

In Kanara Davidson obtained one nest in "comparatively open country," while in Travancore Stewart took two or three nests "in the open on the outskirts of forest."

Most nests are built rather high up in big trees, sometimes at the extreme top, but, as Hume remarks, "in bare country, such as Harriana or Western Rajpootana, you will find the nest not half-way up some stunted neem-tree or scraggy thorny acacia, a mere apology for a tree." Rarely also it will be found building its nest on ledges of cliffs or steep mud river-banks. Hume took two such on the banks of the Jumna.

The bird is very common at Hansil, where Blewitt took thirteen nests which were built on Keekur-trees (*Acacia arabica*) eleven, Ghand (*Prosopis spicigera*) one, and one on a Seeshum (*Dalbergia sissoo*) at heights between 14 and 22 feet from the ground. These nests only measured 14 to 24 inches across.

The nest is not a very large one for so big an Eagle. Hume says that when on ledges of cliffs they are "small platforms" and that when on trees "the nest is a large circular stick structure, some 2 or 3 feet in diameter and from 6 inches to a foot in depth." Most of my correspondents, however, describe the nest as rather small, and about 2 feet or a little over seems to be an average diameter. They are, however, deep in proportion, often a foot or more, and the depression for the eggs is also deep for an Eagle's nest, sometimes as much as 6 inches.

The nests are built of sticks, rather smaller as a rule than those used by other Eagles of similar size, while the lining varies greatly. Sometimes there is none; most often there are a number of green leaves, sometimes mixed with a little grass, while at other times, according to Hume, the egg is "bedded in straw and grass." The materials of which the nest is composed are sometimes very compactly put together, while at other times they are very loosely and untidily worked in.

The breeding season is from December to March, but Thompson says that in Garhwal they lay in April and May. In Kumaon, however, Whymper took an egg on the 20th March, little later than some birds breed in the plains, while at Futtigarh Anderson notes that they occasionally breed as late as early April.

In India one egg only is invariably laid. Of records from forty to fifty nests Hume has none of more than one egg, and since his time I have had none reported to me. In Europe, however, they often lay two.

The eggs are pure white, very broad ovals, with a texture rather finer and closer than those of other Eagles equal in size. Hume speaks of a bluish tint which I have never seen and which probably refers to very fresh eggs in which the brilliant green inner membrane gives a tint to the shell.

Thirty-eight eggs, including Hume's, all Indian taken, average 73.5×58.4 mm.; maxima 80.8×63.4 and 76.6×68.7 mm.; minima 67.7×50.4 mm.

Hæmatornis cheela.

THE CRESTED SERPENT-EAGLE.

(1765) **Hæmatornis cheela cheela** (Lath.).

THE NORTHERN INDIAN CRESTED SERPENT-EAGLE.

Spilornis cheela cheela, Fauna B. I., Birds, 2nd ed. vol. v, p. 90.

Hæmatornis cheela cheela, ibid. vol. viii, p. 686.

This very handsome Eagle is found in Northern India in Sind and Kashmir to East Central Assam, but not in the extreme East of Assam East of the Dihong and Dehing, or in the Surma Valley and districts South of the Brahmapootra, where it is replaced by *burmanicus*.

Undoubtedly the favourite nesting site of the Serpent-Eagle is some large tree growing in evergreen forest on the banks of a stream of some size. Occasionally the tree may be more or less a solitary one growing in a glade or in a cultivation-clearing inside the forest hut, as a rule, the tree selected is one well inside the forest itself. Unlike so many Eagles which like to build their nests on the top, or nearly the top, of the tree chosen, this Eagle almost invariably constructs its nest on a fork of the larger lower limbs,

and I have seen a nest not 20 feet from the ground in the lowest great fork of a huge tree and a second in a similar position about 5 feet higher.

They breed at all elevations from practically the level of the plains up to 6,000 feet, at which elevation Jones took an egg near Simla, as usual on the banks of a stream but built between two branches 70 feet up the tree. This curious affection for the vicinity of a stream is noticed by several collectors. Cock took two nests near Dharamsala, one "on the banks of a stream in tolerably well wooded country," the other in a Mango-grove in one of the trees "overhanging a tiny stream." Parker took eggs of a *Spilornis* on two or three occasions, once in Nadia, when I was in the district, from a Peepul-tree on the shores of the Magra Lake, overhanging the water. This, of course, was in the plains at a considerable distance from the hills. I have also heard of their breeding (I did not see the nest) in the Chota Nagpur district, while they are said to breed in the jungles of Malda and Purulia in Bengal, though all these are, I think, certainly the smaller form, *minor*.

The nest is small for the size of the bird. Generally in diameter it is less than 2 feet, while in depth it may be anything from a few inches to about a foot, depending a great deal on how long it has been used, the birds adding to it each year as a rule, though sometimes they lay in most dilapidated and ill-repaired nests. The egg-cavity is fairly deep, often some 4 to 6 inches, and there is generally a lining either of green leaves or of small fresh twigs with their leaves still adhering, but these sometimes absent.

In the plains they breed in February and March but, in the hills, in March, April, and May.

Only one egg is laid, never more.

The eggs of this genus are extremely handsome, and a description of those of the present bird would suffice for all, so far as is known at present. The following are some of the prevailing types :—

- (1) Dull white, very sparsely stippled or freckled at the larger end with pale reddish or with deep blood-red.
- (2) Dull white, with similar markings so dense as to form hold caps at the large end, sometimes with spots elsewhere or with a few pale big smudges.
- (3) Dull white, perhaps tinged with brickish-red, blotched, smudged, or mottled all over with pale red, earth-brown, or dull brick-red, the marking varying a good deal in density and size.
- (4) Similar, but the markings consisting of huge blotches and smears of colour, rather dark reddish-brown to rich brown, and sometimes with secondary smaller blotches of lavender-grey showing through here and there, more especially at the larger end.
- (5) Clear white, definitely spotted all over the surface with red-brown and with tiny spots of blood-red and almost black.

Underlying these are equally numerous small blotches of lavender, giving a beautiful lilac tint to the whole egg.

- (6) White or reddish-white, with small blotches all over of pale brown and equally marked with others underlying of lavender.

In shape the eggs are very constant, broad ovals, almost equal at both ends. The texture is coarse but the surface is not rough, though there is no gloss. I have seen one egg with a pimply surface at the larger end, but this is abnormal.

Sixteen eggs average 71.8×56.2 mm. : maxima 77.3×57.6 mm. ; minima 66.8×52.7 mm.

The male and female both help in the construction of the nest, but the latter alone incubates, though the male passes much of his time on a branch close to the nest. The female sits very close and has to be almost pushed off the nest, while, if articles are thrown at her from below, she generally refuses to move until actually hit. Neither bird, however, makes any further protest against egg or young being stolen beyond opening their bills and raising their crests. This is curious, as they are grand and bold hunters after their food.

(1766) *Hæmatornis cheela minor** Hume.

THE LESSER CRESTED SERPENT-EAGLE.

Spilornis cheela albidus, Fauna B. I., Birds, 2nd ed. vol. v, p. 98.

Hæmatornis cheela minor, ibid. vol. viii, p. 686.

It is very difficult to define the range of this subspecies. Roughly they may be said to inhabit the whole of India South of the Himalayas in the plains. Some systematists will feel inclined to name the Bengal form and give it a separate status. Its small size links it with the plains' bird, but the more rufous under plumage and the broad terminal dark band on the primaries approach the Himalayan form.

In Travancore this form is very common, but in the plains and foot-hills only. In Bengal, if we accept the bird there as the same as *minor*, it is also common but widely scattered.

In its nidification there is little to note different to the typical form, but it is found far more often in quite open country, breeding not only in small groves and orchards but sometimes quite in the open on large solitary trees.

Stewart, writing of "*minor*," records that "this large form, which I took to be *cheela*, breeds at lower elevations on the banks

* The breeding range of the various races of the Continental Serpent-Eagle were in a state of confusion until Stewart provided material from Travancore to elucidate the mystery. The skins of breeding birds, whose eggs he had taken, showed that there were two forms in Travancore: *minor* (= *albidus* Temm.), a plains' bird pure and simple, and *spilogaster*, the Ceylon mountain-bird, occurring throughout the hills of Southern Travancore.

of large rivers, sometimes in the plains. The smaller variety is a bird of the hills, keeping entirely to forest and often breeding far from water. Now Mr. Stuart Baker (from material I have sent home) has identified the larger bird as *albidus* (= *minor*) and the smaller as *spilogaster*, and I have no doubt he is right."

The present race, *minor*, makes much the same kind of nest as typical *cheela*, high up, though not always very high up, in a tree, occasionally in forest but, more often, one standing in the open and often near a river or big stream. A nest I found in Rungpore was in a Mango-tree, one of an orchard on the banks of the Brahmapootra, close to a little village and surrounded by a sea of grass. It was small for the size of the bird, well under 2 feet across but about 8 inches deep, with a depression about half as deep for the single egg found in it. Lining and construction were like those of the nests of *cheela*. Most nests seem to be placed near water. In Travancore, where Stewart obtained a really wonderful series, three out of every four nests were in trees beside the rivers Punalur and Kallaar and the Shencottah streams. Parker obtained a nest in Nadia on the banks of the Magra lake, taking eggs from it for two or three years, one in 1884 when I was in Nadia myself.

In Travancore the breeding season is from December to March; in the Konkan Davidson and Vidal obtained eggs in February and March, while in Bengal and the North they breed from February to June. The egg I took in Rungpore was taken on the 29th September, but this must be quite an abnormal date, and I understand that a young one had been previously taken from it that year.

Only one egg is laid. There is nothing to be said of the eggs in addition to what I have recorded of the typical form, from which they differ only in average size.

Thirty-six eggs average 65.7×50.9 mm.: maxima 72.4×52.4 and 70.3×57.6 mm.; minima 61.1×48.7 mm.

From the measurements given it will be seen that the eggs of the various subspecies of Serpent-Eagle overlap in size to a far greater extent than do those of the birds which laid them.

Like the other Serpent-Eagles, the hen of this bird does all the incubation, sitting very close and refusing to leave until almost pushed off the nest. On the other hand she makes no attempt to defend egg or young. She is very loth to desert a nest and will often lay again a second time when a nest has been rifled.

(1767) *Hæmatornis cheela burmanicus* (Kirke Swann).

THE BURMESE CRESTED SERPENT-EAGLE.

Spilornis cheela burmanicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 99.

Hæmatornis cheela burmanicus, *ibid.* vol. viii, p. 086.

The Burmese race of Serpent-Eagle is found all over Burma as far South as Tavoy and North-West as far as Manipur, Cachar and Sylhet.

Very few nests and eggs of this bird have been taken but there is nothing to show that the nidification differs in any way from that of the other races. It builds in quite similar positions in trees both in forest and in open country, and they have as great a love of water as have the preceding races. Bingham found them breeding in Thoungyeen in Tenasserim, and says that "wherever there is a *quin* (i. e., *marsh*) or large patches of wet paddy cultivation a pair of these Harrier-Eagles are almost certain to be found." He took one egg from a nest in a Kanyin-tree (*Dipterocarpus alatus*), 70 feet from the ground on the 14th March. He describes this nest as $3\frac{1}{2}$ feet in diameter, which seems to be unusually large for this species. Other nests have been described to me as no larger than those of *cheela*. Huine also records under the name of *rutherfordi* an egg from Faridpore, taken by Cripps, but this should rather be referred to *minor* unless the Bengal bird is separated. Eggs were taken by myself in Silchar (16. 5. 11); by Harington near Mandalay (26. 3. 05); by Hopwood on the Lower Chindwin (14. 2. 12); by Mackenzie in the Chin Hills (29. 4. 15), and by Macdonald twice in Popa, Upper Burma.

The eggs differ in no way from those of the other races, and are equally handsome. Eight average 68.7×55.3 mm.; maxima 73.1×56.0 and 67.9×58.2 mm.; minima 66.1×54.1 and 70.0×54.0 mm.

In their habits and disposition they resemble the other races, and Macdonald writes of one bird which actually allowed herself to be caught on the nest and removed but, otherwise, was quite passive.

(1769) *Hæmatornis cheela spilogaster* Blyth.

THE CEYLON CRESTED SERPENT-EAGLE.

Spilornis cheela spilogaster, Fauna B. I., Birds, 2nd ed. vol. v, p. 100.

Hæmatornis cheela spilogaster, ibid. vol. viii, p. 686.

This has the most restricted range of all the continental races of *Hæmatornis*, being confined to Ceylon and the hills of South Travancore, where, according to Stewart, they are to be found in some numbers between about 500 feet and the highest hills, but most commonly between 500 and 2,000 feet.

In Travancore Stewart found them to be birds of the forest and, though in many cases he found nests built on trees on rivers the same as those beside which *minor* bred, they were at higher elevations farther up the rivers. Again, he often found them breeding on trees in deep forest and many miles from any river or water. Another characteristic appears to be the desire to conceal their nests, both Stewart in Travancore and Phillipsou in Ceylon having found nests which were well hidden in the dense foliage of evergreen trees. Both these collectors describe the nests as being much smaller than they expected and in other ways, also,

much the same as those of the other races, the lining being of green leaves or of green twigs with the leaves still attached.

In Ceylon they breed up to 4,000 feet and not quite so exclusively in big trees in dense forest. Phillips writes of one that "it was built in a fork of a small tree about 20 feet from the ground in small boundary jungle between the Estate and a paddy-field." Of another he writes that it was "very well concealed in a clump of tree-fern on the bough of a tree in a small jungle near the Estate."

Layard's description of the nest and eggs is not correct. He says the eggs are generally two in number, but this Eagle never lays more than one, which resembles some one of the descriptions given for the eggs of the Northern race. As a series they are very handsome, and I have seen several beautiful eggs of the fifth type described.

Twenty-two eggs average 62.8×49.4 mm.; maxima 65.5×47.2 and 64.7×51.0 mm.; minima 59.3×49.0 and 65.5×47.2 mm.

A few eggs taken by Stewart are rather longer ovals than is normal with this species. The breeding season in Travancore is January to March. All the eggs I have seen taken in Ceylon were found in February, but Legge says that it breeds in March and April and, though he had never seen an egg, a young bird had been taken from the nest in the latter month.

(1774) *Butastur teesa* (Franklin).

THE WHITE-EYED BUZZARD-EAGLE.

Butastur teesa, Fauna B. I., Birds, 2nd ed. vol. v, p. 104.

This is one of the most widely spread and best known of all our smaller Indian Raptores, being resident over practically the whole of India from the Himalayas to Travancore. It occurs in the Himalayas, and Ludlow obtained a specimen at Gyantse in Tibet at 13,000 feet, though there is no record of its breeding in the hills. In India it is most common in the drier districts and less common in the wetter. Thus it is very common in Bihar and Western Bengal to North-West India and in Central India and the Deccan, while it is comparatively rare in Eastern Bengal, Assam, Burma and again in the humid country of Malabar. In Burma it is found from the North to Tenasserim but seems rare everywhere, though Hopwood found it nesting in the lower Chindwin. It is very common in Sind.

These birds breed only in open country, never, so far as is recorded, in forest. The country may be cultivated or waste ground, and Ticehurst records (Ibis, 1923, p. 251) that in Sind he has seen it "well out in the desert where a few trees exist." The tree it selects may be a single one standing in, or on, the edge of cultivated land, grass lands round villages or even in a garden or compound. One of the

favourite sites is a tree in an orchard or grove, or one of a small group near roadside or village. Marshall found their nests in Saharanpur in Shishum- and Kirna-trees; Hume says they prefer Mango- or thickly foliaged trees. Butler obtained a nest at Deesa on a Neem-tree, growing in a hedge round a yard near the Cavalry Lines. In Sind Eates has taken the nests in White Poplar, Casuarina and Babool-trees.

As a rule it is placed fairly high up in the tree selected, between 20 and 40 feet, but I have records of its being placed in small Acacia-trees quite low down, two in Babool-trees in Bihar being within reach of the hand.

The nest is small and very roughly made of sticks and small twigs without a lining of any kind. In size they run from as small as 8 inches in diameter by about 3 or 4 in depth, while the biggest nests probably do not exceed a foot across by less than half that in depth. Of course odds and ends stick out everywhere and make the extreme measurements more, but the real nest is very small. There is very little depression, the nest being almost a level platform in shape.

The breeding season lasts from February to April, while a few birds lay in May. Most eggs are laid during April in Bihar, Bengal and most of India, while in Sind February and March are the favourite months.

When the eggs are laid Bingham says "it is not a hard nest to find, for the female keeps uttering a curious mewling cry, beginning at daybreak and lasting, with intervals of rest, through the day."

The usual clutch of eggs is two or three, the former almost as often as the latter, while clutches of four are very rare.

Most eggs are very broad ovals in shape, though Hume says they are occasionally slightly pyriform. The texture, for a Raptore's egg, is very fine and close, the surface being beautifully smooth, sometimes almost glossy.

In colour they are bluish or greyish-white, the tinge very faint and disappearing in time. The majority are unmarked, but a fair number of eggs are faintly flecked here and there with pale reddish or with sub-shell markings of grey. Anderson obtained three quite well-marked clutches at Futtigarh, and Eates in Sind has been equally lucky, while in Dehra Ismail Khan Pitman took a pair and a single egg which are exceptionally well marked. The former are strongly blotched with light brown, one at the smaller end and one at the bigger, while the single egg has handsome deep red-brown blotches at the larger extremity and a few small blotches scattered thinly elsewhere. The inner membrane is a bright pale green.

One hundred eggs average 46.4×38.4 mm.; maxima 49.9×39.0 and 47.0×39.1 mm.; minima 43.0×35.8 and 45.0×35.0 mm. Hume gives a maximum breadth of 41 mm.; while a pigmy egg in

my collection taken by Betham at Ferozepore measures only 37.3×29.1 mm.

The female alone incubates but both sexes take part in making the nest. They are very tame birds but not bold, generally making no demonstration when the eggs are taken; Scrope Doig, however, was obliged to shoot one of a pair of birds who repeatedly stooped at his man when attempting to climb the tree to their nest. This was in Sind.

(1775) *Butastur liventer* (Temm.).

THE RUFOUS-WINGED BUZZARD-EAGLE.

Butastur liventer, Fauna B. I., Birds, 2nd ed. vol. v, p. 106.

This Buzzard-Eagle is found over the whole of Burma from the Chin Hills and Shan States to Southern Tenasserim. It occurs also in Siam, Yunnan, Borneo, Java and the Celebes. In it shabits generally, as well as in its nidification, this bird is very much the same as the White-eyed Buzzard. It haunts quite open country, more especially the wide extents of rice-fields, dotted here and there with trees on the partition banks or on casual bits of higher ground, growing singly or in small groups, in which it nests. Occasionally it breeds in thin deciduous forest. Harington obtained one nest with three eggs on the point of hatching, on the 13th of April, in some fairly thick Oak-jungle which he was searching for the nests of Jays (Journ. Bomb. Nat. Hist. Soc. vol. xx, p. 1010, 1912). Finally, Wickham (*ibid.* vol. xxxiv, p. 338, 1930) writes: "a very common bird in the Shan Hills. I found numerous nests, sometimes quite conspicuous nests, in solitary trees in paddy-fields and not too high, also nesting in the fork at the top of an Oak-tree in jungle."

Harington (Shan States), Hopwood (Mamyio), Cook (Bhamo) and Livesey (S. Shan States) all also obtained nests of this bird. Of the nests recorded in Hume's 'Nests and Eggs' (vol. iii, p. 161) Feilden says that he found one in the typical single tree standing in rice-fields near Thayetmyo, while one of the two nests taken by Oates was on a tree in a Mango-orchard.

All accounts of the nest show it to be identical in every respect with that of the White-eyed Buzzard-Eagle, while the birds themselves seem much the same in their temperament and tameness.

The breeding season is in March and April.

The eggs cannot be distinguished from those of *teesa*, but I have seen no eggs marked other than with a few flecks of pale reddish or grey. The full clutch is two or three and I have no record of a four, though Mackenzie twice took single incubated eggs in Prome.

Sixteen eggs average 46.2×37.5 mm.: maxima 48.7×38.1 and 46.6×40.0 mm.; minima 42.8×36.0 mm. and 43.1×35.3 mm.

(1778) *Haliaëtus leucogaster* (Gmelin).

THE WHITE-BELLIED SEA-EAGLE.

Haliaëtus leucogaster, Fauna B. I., Birds, 2nd ed. vol. v, p. 111.

I can add nothing to the distribution of this Eagle given in the 'Fauna': "Coasts of India, Ceylon and Burma, from about the latitude of Bombay to the Malay Peninsula and through the Malay Archipelago to Australia, Tasmania and Western Polynesia."

This most interesting Eagle breeds in some numbers on the coasts and islands of Malabar and Travancore and in smaller numbers over the whole of the rest of their range. Normally it is solitary in its breeding habits, though in some places two or three pairs may be found together, as in some of the islands off the coast of Akyab. Jerdon, however, recorded that "In Pigeon Island, 30 miles or so South of Honore (Honawa), which is well wooded with large forest trees, a whole colony of these birds have their nests, at least 30 or 40 of them, and the ground beneath their nests is strewn and whitened with bones of sea-snakes chiefly, and also of fish." They nest very often in most public places and seem to have no fear of humanity. Vidal says "where, as frequently happens, they build in large trees in the midst of houses and cocoanut-gardens, they become very familiar and are not easily disturbed. Their loud clanging note when close overhead is almost deafening, and is audible a mile or more distant." Shopland, again, took an egg from a nest in the garden of the Public Hospital at Akyab, and I have other records of nests built in the middle of villages, especially those situated actually on the coast. Sometimes the birds make their nests on very small islands, just a few rocks with a scanty scrub growth and a few large trees. They are common on the Andamans and Nicobars, and both Davison and de Roëpstorff took eggs from nests in Nancowry Island in the latter group.

The Eagles select almost, if not quite, invariably only the largest trees upon which to construct their nests. In Nancowry Davison says that the nest was placed "between two great branches of a large tree at a height of about 80 feet from the ground," while de Roëpstorff obtained an egg from a nest which "was in the top of a very high straight tree and was about nine feet across." Sometimes they are built, as Vidal got them, in "an old Banyan-tree overhanging the massive walls of the ruined island-fort of Suvamdurg." This nest I heard of many years after Vidal first found it in 1869 and again in 1870 took two eggs from it. In 1903 it was still there on the same Banyan-tree, about 30 feet from the ground below the wall.

The age of these nests in many cases no doubt accounts for their great size, which often approaches the one described by de Roëpstorff. Vidal describes them as "gigantic platforms, built of strong thick sticks, fully five feet in diameter, with a comparatively slight depression in the centre." Hume nowhere records

the depth of the nest, but many years ago Davidson, in writing to me, gave the following interesting account of one seen by him on the Malabar coast :—"No one seems to know how old this nest is, and to my questions as to this the only answer I got was 'always.' It must have been there many years, as it was between five and six feet deep, the bottom layers being just crumbling rubbish, as the sticks decayed and fell away so, really, the depth of the nest in no way disclosed its age, for, as the new superstructure was added year by year, so also yearly part of the bottom of the nest had fallen to the ground in dust, the nest itself settling down to the same extent between and on the great limbs where it rested."

The breeding season on the Malabar coast is October, November and December, and I have one egg taken near Ratnagiri on 23rd August, a very unusual date. Stewart took eggs occasionally in January on the same coast, while in Ceylon Legge gives the breeding season as December, January and February. In Burma also November and December seem the favourite months, but in the Nicobars Davison saw the birds incubating in March and de Roëpstorff took an egg on the 24th January.

The number of eggs laid is without exception two.

They are pure white. Vidal calls them greenish-white but, probably, only refers to a tinge given if held to the light from the dark green lining. The texture is coarse, the surface varying from quite smooth, or smooth with a few tiny pores, to very pimply or heavily pitted with pores. In shape they vary from broad to rather long ovals, distinctly pointed at the smaller end.

Thirty-two eggs average 71.7×53.4 mm. : maxima 74.8×53.5 and 73.0×58.0 mm. ; minima 63.5×53.5 and 69.0×50.0 mm.

Both birds assist in making their nest, and it is interesting to note that de Roëpstorff shot a male on the nest, so that probably he takes part in the incubation also. Another interesting trait is recorded by Vidal, who says :—"When once paired these Eagles make the tree on which they have built their nest their permanent head-quarters all the year round, returning to the tree after each foraging trip with great regularity and using the nest as a larder and a refuse pit for fish and snake-bones and other waste food. Once, when the young birds of the season had long left the nest, I found a half-eaten fowl in it, freshly killed."

(1779) *Haliaetus leucoryphus* (Pall.).

THE WHITE-TAILED, OR PALLAS'S, FISHING-EAGLE.

Haliaetus leucoryphus, Fauna B. I., Birds, 2nd ed. vol. v, p. 112.

This Eagle, formerly known as Pallas's Sea-Eagle—a misnomer, as it by no means keeps to the sea-coast—is distributed over the whole of Northern India from the Himalayas South to Sind, Punjab, United Provinces, Bengal and Orissa. In Burma it extends from

the North to Southern Pegu. In the Himalayas it breeds commonly up to an altitude of some 6,000 feet, possibly much higher, as Ludlow says that it is common on the larger lakes in Tibet, such as Bhamtso and Kalo Tso, in Summer, occasionally at an elevation of 12,000-14,000 feet.

It is the most common of all our big Indian Eagles. Hume says ('Nests and Eggs,' vol. iii, p. 163): "In Upper India I do not know a single large wheel which retains water in it as late as February where a pair of this species does not breed; and all down the Jumna, Ganges, Chambul, Indus, Chenab, Jhelum and Sutledge, wherever I have been I have invariably met with at least one pair every 3 or 4 miles, and in particular localities every half mile."

The same may also be said of the rivers of Eastern Bengal and Assam, the Megna, Hugli, Barak, Brahmapootra etc., while in the huge lakes, swamps and morasses of the Sunderbunds the nests are constant and conspicuous sights wherever one goes. They never breed far from water of some kind and, in Assam and Eastern Bengal at all events, the favourite sites for building are in the great trees nearly always to be found in or on the outskirts of some small fishing village. I have seen their nest in trees in the middle of bazaars, where the birds have fed their young or incubated their eggs with perfect content in a babel of sound above which their own rancous voices passed almost unnoticed. In the district of Sylhet a pair chose for their home a single huge Peepul growing by a steamer-ghât on the Barak River, paying not the slightest attention to the whistles and hootings of the steamers or to the turmoil of loading and unloading going on almost under the nest itself.

Like that of so many other Eagles, the nest is occupied year after year. It is big even when first made, a new nest measuring anything up to 4 feet in diameter by a foot or more in depth but, as season succeeds season, it may be added to until it is nearly half as wide again and three or four times as deep. I have never seen any lining in the nest but, sometimes, it certainly adds grass, finer twigs, sticks and green leaves to the hollow in which the eggs lie. The sticks used for the body of the nest are often of considerable size, in some instances as much as 3 to 4 feet long and 2 to 3 inches thick, which must weigh several pounds.

Big trees are generally chosen for the nests and generally such as have dense foliage, but Doig, in Sind, obtained nests which were built on trees growing in the middle of swamps, usually decayed and devoid of foliage. The nests are constructed on large boughs as near as possible to the tops of the trees but not always at great heights. I have seen them on Mango- and Banyan-trees 30 feet from the ground and, on the other hand, on Peepul, Bomhax and other huge trees at all heights from 40 to nearly 100 feet up.

Everywhere the breeding season is the same, November, December and January, but eggs have been taken from the 10th October to the end of February.

The usual clutch of eggs is three, but two only are often laid and occasionally four. They are white, unless sullied in the nest, the texture coarse, but the surface is generally rather smooth, sometimes quite smooth, though never glossy.

Sixty eggs average 69.7×55.1 mm. : maxima 76.8×57.9 mm. ; minima 63.5×53.5 and 69.0×50.0 mm.

This is one of the few of our big Indian Raptores of which we really have a life-history, most of it embodied in Hume's fascinating account :—" I do not think that this species ever takes possession of other birds' nests. It either builds a new nest for itself, or repairs one formerly belonging to it, even though this may in the interim have been usurped by *Otoggys calvus* or *Ketupa ceylonensis*, both much addicted to annexing the poor Fishing-Eagle's laboriously constructed nest. I say laboriously constructed, because I once saw a young pair constantly occupied for a full month building a nest, which they were still at work finishing off when I left. Nothing can seem rougher or more rugged than their nest when finished, and yet out of every four sticks and branches that they brought they rejected and threw down at least three. Both birds brought materials, side by side the pair would work away, then apparently they would quarrel over the matter—there would be a great squealing—and one would fly away and sit sulky on some cliff point near at hand ; after a time the one left on the nest would go off in quest of materials. Immediately the other would drop softly on to the nest and be very husy (though what they did, except lift a stick and put it down in the same place, it was impossible, even with a good glass, to make out) till the absent bird returned, not infrequently with a fish instead of a stick.

"One curious point about these birds, unlike most Eagles, they do not always desert a plundered nest. I have twice taken single eggs out of nests and ten or twelve days later I found that a couple more eggs had been laid."

This, of course, really meant that the birds had completed their laying, but there are several instances known in which the birds, having lost their first *full* clutch, have again laid, after a month or so, another full clutch in the same nest. Hutton describes how a pair of these Eagles defended their young ones so savagely that he had to fire at them, both birds repeatedly swooping at the man as he climbed the tree, collared a youngster and returned. Doig also says that once in Sind he came across a pair of Eagles who made some attempt to protect their young. In the very great number of cases in which I myself, Hume and many others have taken eggs or young the birds have flapped slowly away, making no sign of attack whatever.

Both parents share in the work of incubation, though possibly the male does less than the female ; on the other hand, when the young are first hatched the male does more of the catching fish etc. for their food than the female does.

Incubation lasts thirty days, possibly sometimes two days more or two days less. Eggs, a clutch of three, laid on 3rd, 5th and 7th December, after which the birds began to sit, hatched 5th and 6th January, and the birds remained in the nest until the 18th April, when they climbed out on to adjacent branches, beginning to attempt flights on the 20th, and flying well on the 23rd.

A curious incident came under my observation once when a pair of birds deserted their nest on a huge Simul-tree on the banks of the Brahmapootra, although it was some yards from the edge. In the spring floods the banks were washed away and the tree fell with a mighty crash into the river. What kind of instinct had warned the birds of the impending disaster?

Ichthyophaga ichthyaëtus.

THE LARGE GREY-HEADED FISHING-EAGLE.

(1780) *Ichthyophaga ichthyaëtus ichthyaëtus* (Horsf.).

THE INDIAN LARGE GREY-HEADED FISHING-EAGLE.

Ichthyophaga ichthyaëtus ichthyaëtus, Fauna B. I., Birds, 2nd ed. vol. 7, p. 114.

With the exception of Sind and the North-West of India the Fishing-Eagle is found over the whole of India, Burma, Malay Peninsula and the islands to the Celebes, Java and the Philippines. In Ceylon its place is taken by a smaller race.

This is a very common Eagle in the country at the base of the Himalayas East of Nepal and is also plentiful in Bengal, Bihar, Assam and Burma, but elsewhere it is not common. Hume says that he found its nest on the Nerbudda and on the Ganges, at Saugur, and that Jerdon records its breeding near Rajmahal, where he seems to have found "a whole colony of nests of this Eagle." Brooks also took a pair of eggs from a nest in the Sikkim Terai which I obtained from Otto Müller. Finally, Stewart found it breeding in Travancore.

In Assam I saw many nests, all without exception on big trees within a few yards of a river or stream. It seems immaterial whether the tree is one in dense forest or right in the open; some are many miles from human habitations, others are built in the middle of villages, in noisy bazaars and markets, or occasionally in the more peaceful surroundings of an Englishman's garden. When near rivers running through forest the nest is nearly always on a tree actually overhanging a stream but, when in a village or in the open, they may even be 100 yards from the bank. Any tree, provided it is a big one, will suffice for the nest, but I think they prefer trees which have dense foliage, such as Banyan, Peepul, Mango etc., and if the tree selected is comparatively or quite bare, such as a *Bombax* or Oak, it is always placed at a great height from the ground. Those I have seen in the former type of tree have been anything from 25

to 60 feet up, whilst those in the barer trees have been about 60 to 80 or more. Bingham records a nest taken by him in a Kanyin-tree (*Dipterocarpus alatus*) "at a height of at least 100 feet." One I saw built in a mighty Simul (*Bombax* sp.) in a great plain on the banks of the Brahmapootra was certainly as high or still higher, but I was out after buffalo and did not carefully inspect it.

The nests are very large and very bulky, made of sticks, varying from twigs to bits of broken branch, sometimes with the leaves still attached, measuring as much as 2 inches in diameter. There is little or no depression for the eggs, which are kept from falling off by the roughness of the structure, as they are laid direct on the sticks, there being no lining as a rule though, rarely, there may be a certain amount of coarse grass pulled up by the roots and other rubbish. The nests vary in diameter from 3 to 4½ feet, and are, therefore, not nearly so wide on an average as those of Pallas's Fishing-Eagle. On the other hand they are very deep, especially old nests. One which I knew personally in Assam from 1889 to 1912, and which had been in existence many years prior to my first view of it, grew from about 3 feet deep in 1889 to at least 6 feet in 1912, when it appeared to be very top-heavy. This nest was on a Poepul-tree in an official's garden on the banks of a tributary of the Barak and about 40-45 feet from the ground.

The breeding season is generally from November to January, but I have taken fresh eggs in the end of October, while Stewart took them on the 2nd March in Travancore and Bingham on the 3rd of that month in Tenasserim.

Two is, I think, the number of eggs most often laid, three occasionally, while I have seen four more than once. They are pure white but nearly always much stained, and the texture is coarser and the surface much rougher than it is in the eggs of *Haliaetus leucoryphus*. In shape also they differ from the eggs of that bird in being longer in proportion to their length.

Twenty eggs average 68.6×51.9 mm.: maxima 70.0×51.9 and 69.4×54.5 mm.; minima 59.8×50.6 and 66.3×50.3 mm.

Both sexes incubate, as I have seen the male sitting and have more than once shot him off the nest. At the same time it is probable that the female does the greater part of the work, for the male often feeds her when she is incubating. When the nest is being repaired—I have never seen one being built—the male brings the sticks and the female works them into the nest. Repairing is a very slow job. The birds may start a couple of months before they are ready to lay, and the male wastes much time in bringing sticks which the female rejects. Sometimes for two or three days when the female knows she is about to lay both birds work feverishly for an hour or two, mornings and nights, and accomplish more in the two days than in the previous two months.

Incubation takes twenty-eight to thirty days and the young birds remain about ten weeks in the nest.

(1781) *Ichthyophaga ichthyaëtus plumbeiceps* Stuart Baker.

THE CEYLON GREY-HEADED FISHING-EAGLE.

Ichthyophaga ichthyaëtus plumbeiceps, Fauna B. I., Birds, 2nd ed. vol. v, p. 116.

This Fishing-Eagle is confined to Ceylon, as the birds found in Travancore, though somewhat intermediate, as one would expect, are nearer to the Northern than to the Southern form.

Legge records of this race: "The Fish-Eagle breeds with us in December, nesting in large trees, both along the coast and by the side of the fine old tanks in the Northern and Eastern Provinces. I find, from my rough notes that a nest, from which on the 4th. January, 1873, I took a young bird six weeks old, was made in the fork of an upper limb of a large tree on the sea-coast to the north of Trincomalie; it was constructed of sticks, some of them an inch in diameter, and measured 3 or 4 feet across in one direction and about $2\frac{1}{2}$ feet in another, and contained enough material to half-fill an ordinary bullock-cart. The interior was very flat and constructed of small twigs."

Wait also found this bird breeding on the Mannar tank in the Northern Provinces, and says the nest agreed with the description given by Legge; the two nests found each contained two eggs, one pair of which he sent to me.

The breeding season seems to be November and December. The young bird found by Legge must have been from an egg laid in November, and Wait's eggs were taken in December. The latter measure, *teste* Wait, 67.1×53.1 mm., but the pair given to me only measure 64.0×51.1 and 64.8×50.3 mm., though even these latter are larger than I expected.

Ichthyophaga nanus.

THE MALAYAN GREY-HEADED FISHING-EAGLE.

(1782) *Ichthyophaga nanus nanus* Blyth.

THE MALAYAN GREY-HEADED FISHING-EAGLE.

Ichthyophaga humilis humilis, Fauna B. I., Birds, 2nd ed. vol. v, p. 116.

Ichthyophaga nanus nanus, *ibid.* vol. viii, p. 686.

The range of this Fishing-Eagle extends from Tenasserim, South through the Malay Peninsula, to Sumatra.

So far as is recorded this Eagle seems to keep almost entirely to forest on the banks of streams running through the foot-hills up to some 3,000 feet, and is never found on the more sluggish rivers of the low lands or in the torrents of the higher mountains.

Macdonald, Mackenzie and Hopwood found this bird breeding in Tenasserim in forest on the banks of small streams, making a

large nest of sticks and twigs, sometimes lined with green leaves, built high up in large trees 40 to 50 feet from the ground. A nest found by Hopwood was "somewhere between 3 and 4 feet across and nearly as deep, having been apparently used for several seasons."

The three pairs of eggs of which I have record were found on the 15th November, 29th December and 6th March.

The eggs are exactly like those of the species *ichthyaëtus* and vary in measurement from 55.1×50.2 to 68.0×50.8 and 65.6×53.1 mm. The latter pair are probably unusually large, while the smallest may be unusually small.

(1783) *Ichthyophaga nanus plumbeus* (Jerdon).

THE HIMALAYAN GREY-HEADED FISHING-EAGLE.

Ichthyophaga humilis plumbeus, Fauna B. I., Birds, 2nd ed. vol. v, p. 117.
Ichthyophaga nanus plumbeus, ibid. vol. viii, p. 687.

This race takes the place of the preceding throughout the lower outer hills of the Himalayas from Kumaon and Kashmir to Eastern Assam and Upper Burma. It is not uncommon on all the small and some of the larger rivers running through the hills at all heights from the foot-hills up to some 6,000 feet but, in the Eastern Himalayas and Northern Assam, I found it only exceptionally above about 2,500 feet. In most rivers the dividing line between the areas occupied by *ichthyaëtus* and this species is fairly distinct, the former keeping to the sluggish streams and rivers of the lower hills and plains, while the latter keeps to the more rapid, clearer running water of the higher reaches. On some streams, however, where there are long stretches of slow-moving current between the low hills, yet here and there this is broken by small falls, torrents alternating with small clear pools, the breeding area overlaps. Thus on the Diyung River I have taken the nest and eggs of *ichthyaëtus* two days' journey, say about 50 or 60 miles, higher up the river than a nest taken two days later of *plumbeus*. In this case each bird was a day's journey above or below its normal range.

This Fishing-Eagle in the North and North-West of India seems to be quite as much a bird of open lands as of forest, though they always nest on trees either in or close to the banks of rivers. In the Eastern Himalayas they keep strictly to well-forested country, and I have never seen their nest in any tree in open land, cultivated or waste.

The nests I have seen were only moderately large, about 3 feet in diameter and varying in depth according to the number of years during which they had been occupied. A new, or comparatively new, nest might be a few inches to nearly a foot deep, while I have seen an old nest, said to have been in existence at least forty years, which was deeper than broad and fully 4 feet from top to bottom. The latter was quite decayed and fell away in dust and fragments as

we disturbed the nest in taking the eggs. Generally there is a good lining of green leaves.

Two nests recorded by Hume must be referred to as rather unusual in description. Cook, speaking of a nest found at Hassen Abdul, in the extreme North-West, writes :—"The nest was about $5\frac{1}{2}$ feet in height and about $4\frac{1}{2}$ feet in diameter, and but slightly hollow." Hume himself observes : "It constructs its own nest, returning year after year to the same spot, and each year adding fresh materials, so that the nest, a very large one to begin with, grows in time to an enormous size." Unwin, however, describes a nest as made of "sticks, stubble, weeds and coarse grass, and was about $2\frac{1}{2}$ to 3 feet in diameter."

The breeding-season is March, April and May. Hume says that he believes that they generally lay in January, but gives no instances of their so doing, though Unwin found a young bird, four or five weeks old, on the 27th February.

Normally two or three eggs are laid, two as often as three, but in the North-West Hume says that three is the normal full clutch, though Whympster always found two only. Very rarely four eggs may be seen.

They are just small replicas of those of the larger species, and twenty-eight average 65.2×50.3 mm. : maxima 76.0×53.0 mm. ; minima 60.2×46.6 mm.

Haliastur indus.

THE BRAHMINY KITE.

(1784) **Haliastur indus indus** (Bodd.).

THE INDIAN BRAHMINY KITE.

Haliastur indus indus, Fauna B. I., Birds, 2nd ed. vol. v, p. 118.

This handsome Kite is found all over India, Ceylon and Burma, though in the extreme South of Tenasserim the birds seem referable to the next race. Outside our limits it occurs over most of the Indo-Chinese countries and South China. It is essentially, however, a bird of the plains, and even of the plains only where there is ample water to supply the frogs and mud-fish on which the young are principally fed. Nowhere, so far as is recorded, do they venture into the hills, while rapidly running clear water is of no use to them. They like the sea-coasts, banks of big rivers, large and small ponds, lakes, swamps and ditches. They are most common in Bengal and North-East India and almost equally common on the Malabar coast and parts of Mysore.

For breeding purposes they select trees, growing either singly, in clumps or avenues, or in orchards and, so long as they are not in actual forest, do not seem to mind where they are provided water is close by. In the Sunderbands they seem to prefer above all

other sites the little hillocks which rise out of the vast swamps and rice-fields, affording sufficient space for one or a few fishermen's dwellings and two or three to a couple of dozen trees. On every such hummock there may be one or two nests, and I remember one instance in which about two dozen of these birds were breeding on an extra large island bolding a small fishing village, the birds here living almost entirely by scavenging.

Any kind of tree serves as a site for the nest. I have seen them in *Fici* of all sorts, Tamarind, Casuarina, Mango, Jack-fruit, *Bombax*, many trees of which I do not know the name, and also on Coconut, Date and other palms.

I have never seen one on a bush, but Davidson and Wenden record one built on "a small bush growing out of a rocky bank on the Bhinia River."

Most of the nests seen by myself have been high up in trees, say between 25 and 40 feet, but Davidson says that in Mysore most birds build on low trees in the rice-fields. Jerdon thought that in the Carnatic most birds built in palms, while Blewitt records that in the Sambalpore district the Kites select the tallest tree of a group standing near water. No one appears to have found their nests on buildings, and even Hume says they always build on high trees; yet in Barrackpore a pair made their nest on the cornice of my father's house, which overlooked a tank surrounded by Mango-trees, and twice in Dacca I saw nests with eggs on ruined mausoleums on the sides of tanks on the race-course, while a third was on the flat roof of a house in the Dacca bazaar. In Ceylon they breed in Coconut-palms and all sorts of trees, and Phillips once obtained a nest in a "strip of jungle between paddy-fields and the estate."

The nest is a very rough untidy structure of twigs and sticks, varying in size between 1 and 2 feet across and from 3 to 8 inches deep. Some nests have a lining and some have none while, if there is a lining, it may be composed of almost anything. A few orthodox birds make a decent lining of fine twigs and green leaves, but the majority, especially of those breeding in villages, take almost anything soft which may come to hand. Wool, rags, bits of skins of all kinds, dried fishes' heads, feathers, string, jute etc. are all made use of as and when handy, while occasionally the lining may be tufts of grass and dry weeds pulled up by the roots.

Occasionally a bird may repair an old nest but, normally, they make a new one each season, though they may make use of the material from the previous season's abode.

The nesting season over most of the breeding area is March and April but, in Eastern Bengal, many birds bred in the latter half of December and in January and February. In Siam Herbert found most birds laid in the two latter months, and Bourdillon notes the same of Travancore. In Ceylon, however, Phillips took eggs in March, and in this month also Marshall took eggs in

Saharanpoor, Thompson in Mirzapore, Vidal in the Kōnkan (also in January and February) and, even in Cachar, J. Inglis obtained them in March and April.

The full clutch of eggs is undoubtedly two only, three are often found, while a few clutches have been recorded of four, a number I found not very rare in Dacca in Eastern Bengal. Roughly in that district out of every hundred nests inspected about 3 per cent. contained four eggs, about 10 to 15 per cent. three eggs, and the rest two.

The eggs are merely rather small, poorly-marked replicas of the eggs of the common Indian Kite. Here and there one meets with handsomely blotched eggs, but most are scantily freckled, blotched or spotted with washed-out pale brown, yellow-brown or reddish-brown, rather less scanty at the larger end than elsewhere. Pitman obtained a pair which are really very fine, both eggs being heavily blotched with dark blood-red and reddish-brown all over the larger end. A set of three taken by myself in Dacca and another of two taken by Phillips in Ceylon are quite well-marked, with small blotches of darkish red-brown either at the big or small ends of the eggs, while an egg, one of three taken by Tunnard in Ceylon, has a wide lilac-brown smear at the larger end such as often occurs on Buzzards' eggs. Occasionally one finds a complete clutch of pure white eggs, but most show a few faint markings if examined carefully.

One hundred eggs average 50.7×40.2 mm. : maxima 55.6×44.0 and 49.0×45.0 mm. ; minima 46.9×42.3 and 53.0×37.6 mm.

Both sexes perform the duties of incubation and nest-building, though I think the male's share is to do what he is told by his mate, who bosses the proceedings and is not always very sweet-tempered over them. I have seen a male retire to a tree in sulky despair after the female has rejected stick after stick he has brought for the nest.

The period of incubation is about twenty-six or twenty-seven days, but I have never exactly timed it.

(1785) *Haliastur indus intermedius* Gurney.

THE MALAY BRAHMINY KITE.

Haliastur indus intermedius, Fauna B. I., Birds, 2nd ed. vol. v, p. 120.

This race of Brahminy Kite only occurs within our limits in the extreme South of Tenasserim, whence it extends through peninsular Siam and the Malay States to Java.

The only note on this bird's breeding in Hume's 'Nests and Eggs' is to the effect that Bingham "noticed a pair breeding near Kaukarit on the Haundraw River, but the nest when examined on the 4th April was still unfinished." Mackenzie and Hopwood tell me that they both saw it breeding near Mergui but have no special notes about it.

I have a fine series of its eggs from Mr. J. Houwing taken in Java and, from his account, neither nests nor eggs differ from those of the Indian bird. Only two points seem worthy of note; the nests are usually quite low down in trees in jungle, the lowest and highest recorded being 8 feet and 15 feet from the ground respectively, while the lining, if present, is often much mixed with feathers.

The full clutch of eggs is two, rarely three. As a series they appear better coloured than those of our Indian birds, but this is only because Mr. Houwing has picked out for me an exceptionally fine series from an immense number.

Forty eggs average 52.5×41.8 mm. : maxima 58.1×45.6 mm. ; minima 50.0×42.0 and 50.8×39.0 mm.

Milvus migrans (Bodd.).

THE BLACK KITE.

(1787) *Milvus migrans govinda* Sykes.

THE COMMON PARIAH KITE.

Milvus migrans govinda, Fauna B. I., Birds, 2nd ed. vol. v, p. 122.

The Common Pariah Kite is resident over the whole of India, Burma and Ceylon, extending rarely into the Malay Peninsula, while it has also been recorded in Siam.

Originally the Kite was probably purely a bird of the plains, and it is only where human beings have gradually worked up to health resorts in the mountains that the Kites also have made their appearance in any number. In the thirty years I was in India I had personal experience of this. In the North Cachar Hills the only breeding birds were *lineatus* when I first went to the district in 1886. Later a railway was made to link up the Surma and Brahmapootra valleys, a station was built at Haflang, some 2,300 feet elevation, and in 1900, when I left, two or three pairs of Kites were already breeding there and others making casual appearances in the bazaar. In Simla I am informed that they are now more numerous than they used to be, and that there are several pairs breeding round the native town. In the Nilgiris, according to Davison, Kites are present even at the highest elevations. Where there is scavenging to be done these Kites are always willing to come and do their share of it.

In the plains they breed everywhere. Nine pairs out of ten prefer to make their nests actually in towns and villages or in the trees immediately round them. Others build their homes in trees, large or small, standing in the cultivated fields, waste-land, orchards etc. within easy distance, while a few may be found nesting in actual forest a good distance away from the bigger towns and villages,

but even these are almost invariably close to some small forest settlement or the huts of a jungle tribe.

Generally the Kite constructs her nest on a tree, but does not seem to mind what kind of tree or at what height from the ground. I have seen a nest built in the compound of a "dak-bungalow" perched on a large bough of an almost dead and leafless tree, so low down that I could look inside from the ground, and I have had another in my own garden at least 100 feet up in an enormous Mango, perched among the small branches at the very top. Most nests, however, are built at heights anything between 20 and 40 feet from the ground.

Occasionally they breed on buildings. In Dacca where, with hard work, one could possibly inspect a couple of hundred nests in a day, I have twice seen nests on houses and several times on ruined mosques and mausoleums.

Butler says :—"In Karrachee, as there are no trees, the Kites generally build their nests on the tops of the houses, often on a sloping roof, parapet of a wall, chimney, etc. One nest I saw built halfway up the flagstaff outside the brigade office on a wooden platform extended for the man to stand on when raising or lowering the signal flags."

Occasionally several birds will breed in company. In Barisal I once saw three nests, all occupied, on one tree in a garden and I have, perhaps half a dozen times, seen two nests on the same tree.

The nests are not works of art, being very roughly and untidily made of sticks, twigs, branches with leaves attached and of various other oddments such as rags, skins, coarse reeds, grass, jute-remains, hair, wool etc. Generally there is a lining of grass, wool, large feathers, rags etc., while sometimes there is none at all.

Occasionally one comes across queer nests. Among those I have seen myself was one composed of a turban, placed folded upside down, on a couple of horizontal branches and then filled with grass, twigs and wool. A second was made almost entirely of the greater part of a sheep's skin, over which was a layer of small sticks; a third was made entirely of jute refuse, the lining being of the same material, all picked up from a jute refuse-heap close to the tree.

In Dacca we more than once found golf-balls in Kites' nests, not taken with a view to hatching them, but probably under the impression they were hens' eggs and good for food.

The breeding-season in the plains runs roughly from November to February, but often as early as October and sometimes as late as March. In the lower Himalayas Hume says the usual month is March, while in the higher hills at 6,000 and 7,000 feet they breed in April and May. Even in Bareilly Hume obtained eggs on the 9th May. Davidson says that in the Deccan they breed freely from September to March, while Aitken (B.) obtained them breeding in Karachi in January, February, April, July etc. Scrope Doig, however, in Sind records them as breeding from the 9th February

to the beginning of April, while Ticehurst notes they have eggs in January (Ibis, 1923, p. 253). In Burma Oates says the breeding season is from January to March and Davison took eggs at Moulmein in January.

Two or three eggs constitute a full clutch, while a single egg is sometimes incubated, and rarely four are laid. Hume found four on two occasions, Jones took a four in Campbellpur and I took four eggs at least a dozen times in Dacca, one season taking four such clutches.

The eggs vary from pure spotless white, which is exceptional, to white faintly tinged with grey or greenish, heavily blotched, mottled or scrolled with any shade of brown, red-brown, deep blackish-brown or blood-red. Among other types in my own series, which is fairly exhaustive, are the following, and it must be remembered that every intermediate description may also be met with:—

- (1) Immaculate white, sometimes tinged grey or green.
- (2) White, lightly flecked, blotched or speckled with pale reddish or reddish-brown, sometimes with secondary similar markings of lilac-grey. These may be all over the surface, more numerous at, or entirely confined to, the larger end.
- (3) Boldly blotched or spotted with deep brown, red-brown or blood-red at the larger end, almost spotless elsewhere; in these eggs the secondary blotches are very scanty or wanting.
- (4) Streaked or scrolled all over with lines and hieroglyphics, sometimes all of pale colours, rarely of deep blood-red, usually the lines are very fine, rarely broader and bolder.
- (5) Pale reddish ground, freckled, spotted or blotched all over with light brick-red, reddish-brown or dark brown.
- (6) White, with clouds and smears of dark brown with lilac underlying marks. These very beautiful eggs are exactly like those of *Pernis*.
- (7) White, with three or four huge smears of brown and lilac at the larger end.
- (8) White, the primary markings, of whatever character, few or obsolete, the secondary characters of grey and lilac, numerous and dominant.
- (9) Hume adds to these: "ground-colour a dull mottled purple, clouded over with deeper shades of purple-brown."

Many eggs of the Kites are superficially indistinguishable from those of the Honey-Buzzards, but Kites' eggs have a bright deep green inner membrane, while those of the Buzzard are pale yellow or yellow-white.

In shape the eggs are rather constant, being broad ovals, almost equal at both ends. The texture is coarser, but the surface varies from fairly smooth to rough and pimply.

Two hundred eggs average 52.7×42.7 mm. : maxima 57.0×45.0 and 56.4×45.1 mm. ; minima 49.1×40.9 and 50.0×39.1 mm.

Northern Indian eggs average larger than Southern ones.

Both birds incubate and both assist in the construction of the nest. I have never seen either parent show any real resentment to the taking of young or eggs, but Scrope Doig says "in some instances the parent birds showed a very determined objection to having their nests robbed." The only demonstration I have ever noticed was the swooping of the bird towards the intruders but always at a very discreet distance, and even this was most exceptional.

(1788) *Milvus migrans lineatus* (Gray).

THE BLACK-EARED, OR LARGE INDIAN, KITE.

Milvus migrans lineatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 124.

This fine Kite breeds within our limits throughout the Himalayas and in the hills of Southern Assam, Upper Burma and the Shan States. Outside our limits it occurs as far East as Japan.

Over the greater part of the Himalayas its breeding altitude is from 5,000 feet upwards, and it nests freely in Tibet at 12,000-14,000 feet. In the Eastern Himalayas it breeds much lower and is the form resident as low as 2,500 feet in the forests of the Barail Range and in Manipur.

The Large Indian Kite is the mountain and forest representative of *govinda* but, unlike that bird, is not a scavenger pure and simple. It will certainly haunt camps and, in some places, visits villages and their outskirts in search of food, but its nesting home is in the forests well away from human habitations. It is only in the greater heights, where forests of big trees are rare, that the birds breed in the open in single trees. Ludlow says of this Kite in Gyantse (Ibis, 1928, p. 213) : "it arrived with unfailing punctuality during the last two days of February. Nest construction (often repairs to old nests) begins in April, and eggs are deposited in May. Generally a single egg is laid."

The nest is like that of the Common Pariah Kite but the lining is generally, not exceptionally, of small twigs overlaid with green leaves. It is, as already noted, most often built at a considerable height from the ground in big trees, with dense foliage, standing in deep forest. In Kashmir, however, where Osmaston took many nests from Srinagar, 5,000 feet, upwards, they often nest in Chenar-trees standing more or less in the open. Here also they place their nests very high up, and Osmaston gives the heights as from 70 to 100 feet.

In the Assam hills the birds breed from February to early April, in Kashmir, the Murree hills etc. in March and April, while in the higher ranges April and May are the two months in which most eggs are laid.

The most usual clutch is two but three is not uncommon, while occasionally only one is laid. Ludlow says that one forms the normal clutch in Gyantse, but all the eggs obtained by Steen, Kennedy and others were in pairs.

The eggs only differ from those of the plains' bird in averaging a good deal larger and go through all the same wide range of variation in character and colour of markings.

One hundred eggs average 57.3×45.2 mm. : maxima 61.4×45.1 and 61.0×47.5 mm. ; minima 53.8×47.0 and 54.1×41.0 mm.

I have shot the male off the eggs, so he undoubtedly helps in incubation, but I have not been able to ascertain whether both sexes help in making the nest. I have watched them at work, but the nest was high up in dense evergreen forest and it was impossible to follow their movements closely.

Elanus cœruleus (Desf.).

THE BLACK-WINGED KITE.

(1789) *Elanus cœruleus vociferus* (Lath.).

THE INDIAN BLACK-WINGED KITE.

Elanus cœruleus vociferus, Fauna B. I., Birds, 2nd ed. vol. v, p. 125.

The Black-winged Kite is found over the greater part of Ceylon, India and Burma and has also been obtained in the Laccadives. In Burma it only occurs as far South as Northern Tenasserim and is common nowhere; in Assam it is equally scarce but, in some other parts of India, it is very plentiful. In some districts of the North-West, in Bombay and in Sind they are very numerous. Davidson says that in the Deccan "they are moderately common" and that they "breed abundantly in the Calagdi district, some 50 miles from Sholapur, in December." It is also plentiful in the Saugur district in the Central Provinces. Some forty or fifty years ago it was also very plentiful in many parts of Bihar, but is much more scarce at the present time.

In Kharaghora it is extraordinarily plentiful in some years. In 1892 Davidson and Bulkley (Journ. Bomb. Nat. Hist. Soc. vol. vii, p. 544, 1893) found ten or twelve nests, all with eggs, in about three weeks.

It is a bird of open country or quite thin forest and is resident, breeding wherever found. It undoubtedly, on the whole, prefers rather dry areas of wide open spaces, cultivated or waste, in which there are a good many trees, small or large, growing singly or in groups or else covered by thin deciduous forest, such as sâl or other timber, without much undergrowth. In wetter areas, such as Assam and parts of Bengal, the birds have, perforce, to be content with groves or single trees with dense foliage but, in these districts, the birds are rare.

They do not seem to mind much what sort of tree they nest in. In Bihar they may be found 50 or 60 feet up in great Mango-trees standing singly or in groves, or the nests may form conspicuous objects in small Acacia or other trees standing alone in rice-fields or other cultivation. In Bihar also Inglis found them occasionally breeding in clumps of bamboos (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 559, 1903). In the greater part of their Western and North-Western area, where miles of country may be found with only scattered trees of small or stunted growth, except round villages etc., the birds seem actually to prefer small, scanty foliated trees. Butler writes :—"I found several nests of the Black-winged Kite this year (1876). The whole of the nests were built near the top of low thorny trees growing in grass-banks, at heights varying from 9 to 15 feet from the ground." Yule (Capt. J. N.) also says that in Poona the nests "are nearly all on Babool-trees, two or three on another thorny tree in thin jungle, and one on a small Mango-tree." Yet again, in Sholapur, Davidson remarks that "I have seen at least 25 nests, almost all along the sides of a nullab, on small babool-trees, 15 feet or so from the ground."

The nest is small for a Raptore's and might easily be mistaken for that of a Crow. It is built entirely of twigs and these, unlike those to be found in Crows' nests, are much of a muchness in size, seldom much bigger or smaller in thickness than a thin lead-pencil and from 4 to 8 inches in length. The nest itself varies from 8 inches to a foot in diameter and from 3 to 5 in depth. Its composition seems to vary much in compactness. Blewitt calls them "somewhat compactly put together." Adam says it is "loosely constructed," and elsewhere: "The nest was so loosely constructed that with my binoculars I could see that it contained eggs"; while Thompson uses the term "densely constructed" and other writers speak of it as "well built," "well put together," "more compact than a Crow's nest" and so on.

The depression for the eggs is usually shallow, 1 to 3 inches, and is often lined with grass or oddments, though at other times quite unlined.

The breeding season is very extended, but there appear to be two fairly definite periods during which most eggs may be found. Of these two the more important is from November to early March, while the second is after the Rains break in June to early October. There are no months, however, in which eggs have not been taken in some portion of its habitat. Bulkley and Davidson took them in Cutch in July, November and December, and the former also in January to March. Inglis, in Bihar, found eggs from September to November and in January and July; Adams took a clutch on the 14th August near Sambhur. Yule obtained nests with eggs or young round Poona in February and every month from June 16th to October 10th.

In Ceylon Legge records it as breeding from December to March and, in Siam, Herbert found eggs in the same months.

The eggs number three to five or, very rarely, six in a clutch, three or four being most often the full complement.

They are very richly coloured handsome eggs. The ground-colour varies from white to pale cream, yellowish-stone or buff, the greater part of the white surface being covered by bold blotches, smears and spots of deep red or red-brown, occasionally with a few specks or marks of almost black blood-red here and there. The variation is great, much as in Kestrels' eggs, which they closely resemble. Some are so closely vermiculated all over that they appear uniform rich brick-red, and I have seen a few eggs with a pink tinge. Other eggs have bold blotches rather more sparsely scattered and showing up against the paler ground; in some these are scattered all over the egg, in others they are more numerous at the larger end and in some entirely confined to this end, where they may form an ill-defined cap. In many clutches one egg is much less freely marked than the others, sometimes having only a few deep red or purple-black specks, spots or hieroglyphics on the bigger half. Herbert, who took several nests of this bird, proved that in every case the feebly marked egg was the last laid. As each egg was laid it was examined and marked and, no matter whether the clutch contained three or four eggs, the result was the same.

One hundred eggs average 39.3×30.9 mm. : maxima 41.7×30.6 and 38.3×32.1 mm. ; minima 35.9×30.1 and 41.2×29.0 mm.

Both sexes incubate and both assist in building the nest, but the male's share is the smaller of the two; in building he only brings material to the female, while his hours of incubation appear to be short. On the other hand, he sometimes feeds the female on the nest and, when the young are hatched, does the major part of the food-collecting for them.

Beyond squealing and hovering round, the parents make no further demonstration against the theft of young or eggs and, sometimes, are content to watch proceedings, sitting in sulky silence on an adjacent tree.

This Kite seems to have extraordinary breeding irruptions into various districts which have no visible cause, though doubtless due to food-supply. Davidson (Str. Feath. vol. viii, p. 415, 1879) writes of Sholapur :—"The bird used to be a rare one in the district, but since the famine a great deal of land has returned to its pristine condition and this little Kito is now the commonest bird of prey." Bulkley (*op. cit.*) recorded a sudden influx of birds in Guzerat in 1902, the birds remaining equally common until 1904, after which the number returned to normal. In Bihar it became suddenly much more numerous in 1909, remained so for three or four years and then dropped to its usual numbers. In Sind also its numbers fluctuate greatly, and Eates tells me that in some years he sees many nests and in others only one or two. The same occurs in the Deccan, and probably rainfall, with its effect on insect-life and consequent food-supply, is the main factor in their movements.

(1793) *Circus melanoleucus* (Forst.).

THE PIED HARRIER.

Circus melanoleucus, Fauna B. I., Birds, 2nd ed. vol. v, p. 132.

The usual breeding range of this Harrier is in Eastern Siberia, Mongolia and Northern China, but it is possible that a few birds breed in the uplands of Assam and in Burma.

In North-East Cachar there are some vast rolling hills at an elevation of 2,000–3,000 feet, covered for the most part with long grass, which is yearly burnt. In the hollows between the hills there is nearly always some water, in which grow reeds, defying the fires, but which are sometimes cut down to make way for a little rice cultivation, the fields being in small raised terraces with intervening banks covered with reeds and coarse grass. The surrounding country was one of my favourite centres for big game shooting and, almost every year, when camping in May, June and July, I saw one or two pairs of this bird quartering the ground for food. Sometimes a male only was visible, the female possibly being engaged in incubation, and enquiries of the local tribesmen, Mikirs, elicited the information that they did from time to time find the nests in July and August. These they described as circular pads of rushes placed in among the bottoms of the reeds on the banks between the rice-fields. A reward offered for birds with eggs eventuated in a female Harrier with four eggs being brought to me the following year (1894). They had been kept for a long time and the bird was in remnants, but I then identified it as *argyrosus*, though I now think it may have been of the present species.

The Mikir informed me that he had seen a Hawk fly out of the long ekra and grass growing in a swamp beside his rice-field, and on going to see if it had left anything behind it which he could eat found the nest. This he described as a large pad of grass and weeds over a few sticks, low down among the reeds and just clear of the water. He then snared the female and roughly skinned it, keeping it until he could hand it over to me. This, of course, only proves that a Harrier of some kind breeds in North Cachar, though I personally have little doubt that it is of this species.

T. R. Livesey assures me that in the Shan States pairs of these birds are constantly seen throughout the Summer, and in 1931 he wrote me that there was one on the Inle Lake on the 22nd June.

Eggs taken in Siberia are white, sometimes faintly flecked with reddish blotches; those taken by the Mikir were quite spotless.

In shape they are broad ovals, with a fairly smooth texture and surface. Four to six eggs form a full clutch and they are said to be laid in Siberia in April and May.

Twenty-eight eggs average 43.6×34.5 mm.: maxima 45.0×36.9 and 43.0×36.0 mm.; minima 40.5×34.0 and 40.6×32.0 mm.

Buteo rufinus.**THE LONG-LEGGED BUZZARD.**(1796) **Buteo rufinus rufinus** (Cretzsch.).**THE LONG-LEGGED BUZZARD.***Buteo rufinus rufinus*, Fauna B. I., Birds, 2nd ed. vol. v, p. 137.

Within our limits the Long-legged Buzzard only breeds in the North-Western Himalayas and, even there, in small numbers.

I can add little to what is recorded in the 'Fauna':—"The records of the nidification of the Indian Buzzards are so mixed that they are not easy to unravel. We certainly have three species breeding in India. The present one, *rufinus*, is not uncommon in the Western Himalayas; *hemilasius* (= *Archibuteo hemitolophus*) breeds in Tibet and possibly in other parts of the higher Himalayas. These are both big birds, whilst the third, *vulpinus*, which also breeds in the North-West of India, is a much smaller bird, laying a much smaller egg." (I might have added, much more highly coloured.)

"The Long-legged Buzzard breeds within Indian limits from the Afghan and Baluchistan border to Kashmir and Garhwal and South to Nowshera, where eggs were obtained with the bird by Cock. Rattray took the nest in the Murree Hills (thought to be *desertorum*=*vulpinus* at the time) and Parker had one egg from a nest, taken below Simla, together with the female and a young bird."

The above eggs are authentic beyond doubt, and I have other eggs from Kohat and one from Sonamurg which also appear to have been correctly identified. On the other hand, a clutch of three taken by Buchanan, also in Kohat, and another taken by Crump on the borders of Ladak and attributed to this bird, are almost certainly eggs of the more common *vulpinus*.

The nest may be placed either on a tree in forest growing on mountain sides or on a crag or shelf of rock. Cock obtained a nest with two eggs at Nowshera which he describes as follows:—"In April 1872 I observed a pair of *Buteo ferox* about a high cliff that overlooked a dry ravine about three miles from the Station; three days after this a Pathan told me that a big bird had a nest on the cliff. I went with him and, looking over the edge of the cliff, could see the sticks of which the nest was composed, but not the interior of the nest, because of the overhanging cliff. Throwing down some pebbles the old bird flew out and I saw that it was a *Buteo ferox*; she flew across the ravine and settled on the edge of a cliff opposite. By means of a rift in the face of the precipice the Pathan got down to the ledge on which the nest was placed, and by the aid of the rope got to the nest, which contained two eggs. I told him to leave the eggs and I went down below under the cliff

and sat down. The old bird soon returned and seated herself on the eggs. Calling out to the Pathan to fling down pebbles, I prepared to shoot her, which I did when she flew from the nest. I now went up and took the nest, which was a moderately large structure of sticks placed under an overhanging ledge, about 80 feet up; the nest was lined with dry twigs and the two eggs were much like Kites' eggs, only larger."

Rattray found his nest in the Murree hills in much the same position as the above, but there were four eggs, one of which was broken in getting them down. The bird was shot and sent to me for identification. The Kashmir nests that I have notes of were all big structures of sticks built in trees, in some instances very high up, and none of my correspondents mentions any lining.

The breeding season seems to be April and May, but I have one egg taken at Kohat in March and another single egg taken on the 1st June in Kashmir by Buchanan.

Two clutches of eggs, one of three taken by Buchanan in Kohat and another of three taken in Ladak by one of Ward's collectors, are more probably *vulpinus* than *rufinus*, and I eliminate them from my figures given below.

The eggs are like those of *B. hemilasius* but are more richly and boldly marked than those of any other Indian Buzzard.

Eight Indian-taken eggs in my collection average 59.6×47.6 mm. : maxima 62.4×48.0 mm. ; minima 57.2×46.2 mm. One hundred European eggs average 59.65×46.94 mm. (Hartert).

It would appear that some of our Indian collectors, having taken one Buzzard's nest and having satisfactorily identified the bird, have then found a second nest of a Buzzard and have put it down to the same species without further investigation. Two such instances have come within my own experience, and they show the infinite care which has to be taken in such circumstances.

(1797) *Buteo hemilasius* Temm. & Schleg.

THE UPLAND BUZZARD.

Buteo hemilasius, Fauna B. I., Birds, 2nd ed. vol. v, p. 140.

So far as is known at present the Upland Buzzard breeds within our limits only in Tibet, but it probably breeds in other parts of the higher Himalayas also. Its extra-limital range extends North-East to Siberia and Mongolia, to Japan and, possibly, to the North-Central Chinese hills.

This Buzzard in Tibet appears to be entirely a rock-builder, making a very large nest of sticks, often of considerable size, on ledges or in crevices of rocks in cliff-faces. In many cases the birds make a fairly good lining of grass, both in scraps and in bunches torn up by the roots, while in one instance tufts of wool have been noticed mixed in with the grass.

The first record of the nest is that of Bailey (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 522, 1909), with a very good photo. He writes:—"I send you a photograph of a nest of *Archibuteo hemito-*

lophus (= *Buteo hemilasius*) which I took near here on the 12th April this year at an altitude of 14,800 feet. The nest was made of sticks (one of which was over 5 feet long) and lined with blades and roots of coarse grass. The Tibetan name of this bird is Cha-kyi." A skin of a Buzzard shot close by the nest and presumed to be the owner was identified by Mr. N. B. Kinnear as that of this species. Later (*op. cit.* vol. xxi, p. 182, 1911) Bailey notes that, having compared the two eggs he found with others, he thinks they are too large and that the bird shot near the nest the following day could not have been the owner.

Probably, almost certainly, however, Bailey's first identification must have been correct. The nest and eggs are those of a Buzzard; no other Buzzard breeds near Gyantse, and I have since received other eggs and skins and descriptions of nests from Gyantse which exactly tally with his.

Stein also obtained eggs of a Buzzard, which he sent to Dresser, together with a skin which the latter identified as of this bird. The eggs, and I think the skin, are now in the Manchester Museum.

The eggs sent to me have all been taken from nests described as huge affairs of sticks lined with tufts of grass, or grass and wool, placed on ledges or in crevices of rocks. I have records of eggs taken on 29th April, a clutch of three, on 24th June, two more eggs taken from the same nest, and another clutch of three taken on the 19th May.

The breeding season, as will be seen from the above notes, is April and May in Tibet, while in the Amur and Altai May and June are the two months in which most eggs are laid.

The full complement of eggs is three or four, two only being occasionally incubated.

They are pure white in ground or white tinged with grey, ochre or pale buff. A few eggs are much like those of the preceding bird, faintly blotched all over with pale reddish and with equally faint underlying markings of lilac and lilac-grey. More often they are well blotched all over, or at the larger end, with deep rich brown with a few obsolete secondary markings of grey. Some clutches are quite handsome, especially a type with large smears of light brown, with a few others of deeper redder-brown and fairly numerous, but very faint secondary smears of palest grey. In these eggs all the markings are more numerous at the larger end than elsewhere, and occasionally form a definite cap. I have one clutch taken by Semionoff at Radeffka in which the primary markings are very few, absent in one egg, but in which pale lilac blotches are numerous everywhere. As a series the eggs are much better marked than those of *vulpinus*, yet not so richly coloured as those of *rufinus*.

The texture is coarse, the surface smooth to rather rough, while the usual shape is a very broad oval.

Fifty eggs average 58.8×45.5 mm. : maxima 64.0×46.0 and 61.9×47.9 mm. ; minima 53.5×43.5 and 58.6×42.6 mm.

(1798) *Buteo vulpinus* (Gloger).

THE DESERT-BUZZARD.

Buteo vulpinus, Fauna B. I., Birds, 2nd ed. vol. v, p. 142.

The Desert-Buzzard occurs over the greater part of Western Asia, ranging through Asia Minor and Palestine to South-East Europe. It extends to North-West India and is the small form which, under several names, has been recorded as breeding on the North-West Frontier and in Kashmir.

They are birds of more or less open country, but build both on trees and, though less often, on ledges of cliffs, or holes in rocks on the faces of precipices.

The accounts of this bird's breeding are very conflicting. In 1903 Ward took a beautiful clutch of three eggs, which he sent me with the skin, and which I then identified with some doubt, as it was small and very rufous, as an Upland Buzzard. Then in 1908 he again sent me an egg—one of two—and the bird shot off the nest. This was undoubtedly *vulpinus*, but the eggs were exactly like those previously sent, and closer examination showed the birds to be so likewise, and correctly named *vulpinus*, or *sibiricus* as we then called it. In March 1901 Buchanan took two clutches of three eggs each, one at Hassan Abdul and the other near Kohat; one of these, the first, he attributed to *ferox* (= *rufinus*), but the second, after first calling it *ferox*, he then changed to *vulpinus*, to which species both the clutches certainly belong.

In addition to these I found in a small collection of eggs I bought at auction from O. K. Tankard a clutch of two eggs marked 27. iv. 92 in Ward's handwriting, and named *Buteo*; to this had been added, in another hand, "*ferox*," but these also are undoubtedly *vulpinus*.

Ward obtained his four clutches of eggs from nests three of which were built on trees and one on a cliff. Of the three on trees one was on quite a small scrubby tree on an open hillside covered with grass. This is described as a large nest of sticks lined with green twigs and green leaves. The other two nests were both on trees at great heights from the ground.

The breeding season on the North-West Frontier appears to be March and April and in Kashmir April and May, one clutch of Ward's having been taken as late as the 21st June; these were the eggs recorded as taken at 11,000 feet elevation.

In India two or three eggs only are laid but, in Europe, four are often taken, though three is more usual.

For Buzzards' eggs their small size and rather long oval are striking but, now that it has been possible to arrange a series that may be definitely allocated to this race, the colouring is often seen to be better rather than poorer than in those of the other species. Poorly coloured eggs are of course common, but some are well and a few really handsomely marked. An exceptionally beautiful clutch

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taken by Buchanan has one egg with a cream ground heavily marked, especially at the small end, with reddish-brown, almost confluent on the smaller half. The other two eggs are white richly blotched with dark reddish-brown. With the exception of this clutch all the others I have seen can be matched by eggs of our other Buzzards.

Eighteen eggs average 57.0×43.3 mm. : maxima 59.9×47.0 mm. ; minima 52.1×42.4 and 53.8×40.5 mm.

***Astur gentilis* (Linn.).**

THE GOSHAWK.

(1801) *Astur gentilis schvedowi* Menzh.

THE EASTERN GOSHAWK.

Astur gentilis schvedowi, Fauna B. I., Birds, 2nd ed. vol. v, p. 146.

This race of Goshawk replaces our European bird in Asia and breeds over the greater part of Central Northern Asia as far South as the North-West Himalayas, the Tibetan plateau and the hills of Northern China.

There is no doubt that the Eastern Goshawk breeds in some numbers in the North-West of India, though there is very little on record about it. All Hume says is:—"The Goshawk breeds in India, so far as I have been able to ascertain, only in the higher regions of the Himalayas, in the immediate neighbourhood of the snows." The only eggs in his possession were obtained in a nest built in a "Deodar tree in Bussahir on the 15th April at an elevation of about 9,000 feet." He also saw a pair of young birds brought in to Simla, taken near the Chor, and which were said to have been taken "out of a nest placed near the top of some kind of fir or pine-tree." Thompson records, but apparently on hearsay, that the Goshawk breeds from March to June, "building on trees a large circular nest of coarse twigs in which they lay three or four nearly pure white eggs. They confine themselves peculiarly to the interior of the deep, precipitous, woody valleys, lying close to the snowy peaks."

This information is possibly quite misleading, as since Hume's time the only authentic record of a nest is that found for Whympers in Garhwal at the end of March, containing young birds. This was built high up in a big tree on a hillside at an elevation under 3,000 feet, and the birds fiercely attacked the climber who went up the tree to investigate. I should note that in the many nests of the European Goshawk we found in Finland with eggs, many hard-set, the birds made no further demonstration beyond swooping constantly at the man as he climbed the tree, yet never coming within several feet of him, and the Finns never showed any disinclination to climb the trees in which the nests were built.

Hume's two eggs were typical Gosbawk eggs, which he describes as "short broad ovals, slightly compressed towards one end, glossless and of a greyish-white colour. They were much incubated and one of them is a great deal mottled and spotted with faint brown stains, whether natural or the result of dirt during incubation I do not know. Held up against the light the shells are a bright sea-green. These eggs were taken by a native, whom I have always found reliable in the matter of eggs, and brought to me with one of the parent birds, the female. I have myself no doubt as to their authenticity.

"They measure 2.2×1.78 and 2.1×1.7 inches" ($=55.9 \times 45.2$ and 53.3×43.2 mm.).

Jourdain gives the average of thirty European eggs as 57.7×44.8 mm.

Astur badius.

THE SHIKRA.

(1802) *Astur badius badius* (Gmelin).

THE CEYLON SHIKRA.

Astur badius badius, Fauna B. I., Birds, 2nd ed. vol. v, p. 147.

The Ceylon Shikra occurs in the South of Travancore as well as in Ceylon, and both Bourdillon and Stewart have obtained nests and eggs in that province.

There is nothing recorded in Hume's 'Nests and Eggs' on the breeding of the typical form of Shikra, but Leggo says that it is strictly a forest bird and breeds in May and June.

Bourdillon, who took a nest with three eggs on the 25th February, 1908, and one with two eggs so long ago as the 5th March, 1876, says that in Travancore it is not a forest bird but that it "is common throughout Travancore in open country in the plains and it does not frequent forest. It builds a rough nest of sticks and twigs in trees and lays three or four eggs during the months January to April." Stewart confirms this, and says that "they are very fond of breeding on para-trees in Rubber Estates, where they place their nests, built by themselves, at no great height from the ground."

In Ceylon Phillips also found them making their nests on Rubber-trees and took a nest with three eggs on April 2nd.

From the above we can gather that the breeding season runs from the middle of January to the middle of April, and that the number of eggs laid varies from two to four.

The eggs are rather fine in texture with, for a Raptore's egg, a smooth surface, though glossless.

In colour they are a very pale skim-milk blue, and all those I have seen have been quite unspotted, though a bigger series might show that slight spotting, of reddish or grey, does occur in a few cases, just as it does with the other races.

Eighteen eggs average 39.0×31.8 mm. : maxima 43.6×32.0 and 43.2×32.5 mm. ; minima 36.8×31.0 and 37.4×29.3 mm.

I believe both birds assist in building the nest, but there is nothing on record to show that the male assists in incubation. Both parents show great anxiety when their nest is being robbed, and some individual birds of both sexes will attack intruders again and again at such times.

(1803) *Astur badius dussumieri* Temm.

THE INDIAN SHIKRA.

Astur badius dussumieri, Fauna B. I., Birds 2nd ed. vol. v, p. 149.

With the exception of Travancore in the South, Sind in the North-West and Assam in the North-East the Indian Shikra is found over the whole of India.

Wherever found the Shikra is resident and breeds, but this little Hawk eschews extremes and never breeds in evergreen humid forests or, on the other hand, in actual deserts or the driest areas, such as occur in Rajputana and elsewhere. It frequents for preference well-wooded country, both cultivated and waste land, and it ascends the hills in suitable places up to about 5,000 feet or rather higher. Perhaps its favourite site is a Mango-tree, either solitary or in a grove near a village, for they are fearless little birds, and in Bihar and elsewhere more than one nest has been taken in a garden and many from trees actually in villages. Occasionally they breed in thin forest ; indeed, Thompson writes :—"This is a regular breeder in our forests (Garhwal) and always chooses trees standing on the edge of streams or stagnant pools." From the same hills Whymper also records a nest taken about 25 feet up "in a small tree in thin forest."

A. A. Anderson found this Hawk making use of a parasitic plant as a site for the nest. He writes ('Nests and Eggs,' vol. iii, p. 120) :—"Four out of six nests which were taken in my presence this last summer were built in the parasitical shrub (*Loranthus globosus* ?) which grows to such perfection on Mango-trees. The branches of the so-called mistletoe radiate sideways and upwards to a considerable height above the parent tree from a large excrescence or knot, thus forming, as it were, the outer structure of a ready-made nest. Viewed from below the nest looks about the size a common Crow would build ; but on examining one I had cut down (the parasitical plant was four feet above the tree) it was clear that the nest itself was particularly small, and so clumsily made as to fall to pieces on being removed from the knob which supported it."

Everyone compares the nest to an ill-made, loosely put together nest of a Crow. Butler, describing a nest in Deesa, says "much like an old Crow's-nest." Inglis and Coltart in sending me eggs from various places in Bihar mention "nests like old and rather dilapidated nests of Crows." Benjamin Aitken says that in Berar

he took four white eggs of the Shikra "in an old Crow's nest up in a large tamarind-tree"; while, finally, Hume himself says that "these little Hawks take, I should say, a full month in preparing their nest, only putting on two or three twigs a day, which they place and replace as if they were; *very* particular and had a great eye for a handsome nest; whereas, after all their fuss and bother, the nest is a loose, ragged-looking affair, that no respectable Crow even would condescend to lay in." The nest is small, being about 10 inches on an average and only 3 or 4 inches deep.

The nests are made entirely of sticks except, in some cases, for a scanty lining of grass, and they seem invariably to be loosely and very untidily put together. They prefer big trees in which to build but do not necessarily place them very high up, 20 to 40 feet being the normal limits. So far as my own experience goes—not very exhaustive—they select trees with dense foliage, and the nests are not so situated as to be conspicuous, but I have heard more than once of nests being built low down in small, almost leafless trees growing in the open.

All over their breeding range April and May are the two months in which most eggs are laid. Butler found young some six weeks old on the 24th May at Deesa, in which case the eggs must have been laid in March, and Vidal says that in the Konkan they breed in March and April, while Howard Campbell took three eggs from a nest at Gooty on the 22nd February, and Kinloch, in the Nelliampathy Hills, took three eggs on the 27th March. At Gujranwala, however, Whistler found two fresh eggs on the 3rd July.

Hume says that three eggs form the normal clutch, a dictum which Inglis, Coltart and my own experience confirms, but Anderson considered four to be the usual full clutch and once found five. Whistler also records (Journ. Bomb. Nat. Hist. Soc. vol. xxiv, p. 704, 1916) once taking five eggs in a nest at Gujranwala.

The eggs are a pale skimmed-milk blue or pale bluish-grey, very faint in tint, yet they are only exceptionally white. Very rarely they may be lightly speckled at the larger end with blackish pin-pricks or with rather larger sub-shell blotches of pale grey or lavender.

The texture is fine and the grain close and compact, the surface generally smooth, though glossless. I have quite a number of eggs, however, which have curious little corrugations and one clutch in which the surface has numerous little raised lines scattered here and there over the surface. In shape the eggs are broad ovals and exceptions are rare.

One hundred eggs average 38.8×31.1 mm.: maxima 42.6×31.6 and 41.3×33.0 mm.; minima 36.1×29.2 mm.

Incubation lasts about twenty-one days, the female beginning to sit sometimes when the first egg is laid, though at other times she does not incubate until the clutch is complete. I have no information as to whether the male ever assists in incubation, but when building

he brings material to his wife for her to employ on the construction of the nest.

They are brave little birds and will boldly attack an intruder intent on stealing eggs or young, even venturing to swoop on human beings under such circumstances. If the eggs are taken they will sometimes lay again in the same nest, but it is unusual for them to breed in it for more than one year.

(1804) *Astur badius cenchroides* Severtz.

THE SIND SHIKRA.

Astur badius cenchroides, Fauna B. I., Birds, 2nd ed. vol. v, p. 150.

This race of the Shikra breeds in Turkestan, Afghanistan, Baluchistan, Eastern Persia, in Sind and in the extreme North-West of the Frontier Provinces.

Ticehurst seems doubtful as to whether *cenchroides* is anything more than a winter visitor to Sind, and writes (Ibis, 1923, p. 257):—"I have not seen any breeding birds from Sind, but winter specimens belong to both races, *cenchroides* and *dussumieri*; one must be a winter visitor, probably the former."

Scrope Doig "found nests of this bird on the 22nd and 29th April, each containing three eggs. Nests situated high up in Kundy-trees growing in the middle of dense thick tamarisk-jungle."

This Shikra is a very common bird in Sind but keeps to the better wooded, less arid parts, though Ticehurst thinks it also breeds "in the more desert tracts." Bell informed Ticehurst that he got eggs on the 19th March and 30th April, and that the bird prefers "trees with plenty of leaf, such as babool or kundi in the thickish forest." Bulkley, however, obtained nests from trees in the open, while Eates, who has examined very many nests, has seen them in thin and thick scrub, both in Babool- and Kundi-trees, quite in the open cultivated land in other trees by no means densely foliated, and also in a Casuarina-tree close to a village about 20 miles from Karachi.

The nest is exactly like that of *dussumieri* and its habits and breeding generally similar.

In Sind it breeds from March to May and possibly a good deal earlier, while Pitman took fresh eggs near Dehra Ismail Khan on the 28th March. Williams has a very interesting note on their breeding near Quetta (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 610, 1928):—"This Hawk is fairly common throughout the Quetta valley and breeds all through the Summer, building its nest in lofty leafy trees or else commandeering a Magpie's disused tenement.

"At Pishin there is quite a colony of them breeding in Beech-trees in the Political Agent's compound. This was towards the end of June, and nearly every nest had young. From one nest I got a full-fledged bird and an addled egg."

The normal clutch of eggs is undoubtedly three, but four are not rare. They are not distinguishable from those of the other races, but marked eggs seem to be very rare. Eates has obtained two or three clutches with one or more marked eggs among them and one beautiful clutch of three with all the eggs quite handsomely blotched.

Thirty eggs average 40.4×31.3 mm. : maxima 42.0×31.7 and 41.0×32.2 mm. ; minima 36.8×29.5 and 35.1×29.1 mm.

(1805) *Astur badius polioptis* (Hume).

THE BURMESE SHIKRA.

Astur badius polioptis, Fauna B. I., Birds, 2nd ed. vol. v, p. 151.

The Burmese Shikra extends from Assam, throughout Burma, to Tenasserim ; Siam and the Indo-Chinese countries to Formosa.

Except that it is decidedly more of a forest bird than any of the preceding races there is nothing to add to what has been already said of the breeding of these subspecies.

In Assam we found it breeding both in the plains and in the hills up to at least 3,000 feet. Nests seen by myself containing eggs or young have generally been built in tall leafy trees and fairly well concealed, though the tree itself may have been either right in the open or in thin or deep forest. I found one nest in a densely foliated tree quite close to the road, standing all alone in rice-fields, my attention being drawn to it by the two birds darting out and attacking a passing Crow. Another nest, equally well concealed, was in a tree in dense evergreen forest growing on a precipitous hillside. Both these nests were about 30 feet from the ground, and between 20 and 40 seems the height generally chosen.

It is by no means rare in the Chin Hills, Kachin Hills and Shan States up to nearly 4,000 feet, and nests have been taken by Hopwood, Mackenzie, T. R. Livesey and J. P. Cook. In Burma, as elsewhere, these little Hawks seem to breed both in the open and in forest, but there is very little on record.

The breeding season is April and May, but they must lay occasionally in March or even earlier, as young have been seen on the wing in May.

The eggs number three or four and agree well with those of the other races of *badius*. A curious clutch of three taken by myself is a beautiful pale sea-green, faintly stippled at the larger end with black, but marked eggs are very rare. A clutch of four taken by Mackenzie near Maymyo is really white with no tinge of colour.

Twenty-eight eggs average 39.0×31.8 mm. : maxima 41.0×31.0 and 40.0×32.1 mm. ; minima 36.1×30.2 and 38.2×28.4 mm.

(1806) *Astur badius butleri* Gurney.

THE CAR NICOBAR SHIKRA.

Astur badius butleri, Fauna B. I., Birds, 2nd ed. vol. v, p. 151.

So far as is known this race is confined to Car Nicobar, though Abbot thought he also saw it in Camorta.

All that we know about its breeding is recorded by Butler, who writes (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 680, 1899):—"Not uncommon in forest on Car Nicobar, but extremely shy and difficult to shoot.

"This Hawk probably breeds twice in the year; in September numerous chestnut coloured birds, bred probably in February or March, were about while adult males were in a state of breeding; and I found one nest about 40 feet from the ground, at the end of a horizontal branch of a huge *Ficus*, in which the birds were apparently just about to lay, as one or both were always seated on the branch near it. Had I remained a few days longer on the island I should probably have obtained the eggs."

Astur trivirgatus.

THE CRESTED GOSHAWK.

(1809) *Astur trivirgatus trivirgatus* (Temm.).

THE SOUTHERN CRESTED GOSHAWK.

Astur trivirgatus trivirgatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 154.

This Hawk has a most interesting distribution; first discovered in Sumatra, it is also found from Tenasserim and the Malay Peninsula to the Philippines and again in Ceylon and Travancore North to the Central Bombay Presidency, while it is far from uncommon in the Nilgiris and other hill ranges of Mysore and Southern India. This is one of the best examples amongst the avifauna showing the close affinity of birds in the extreme South of India and Ceylon to those of the Malay Peninsula. Examples are numerous, as in *Turnix* etc., but in none that I know well is the approximation in all respects so complete as it is in this Hawk.

Of the breeding of the Crested Goshawk in the Malay States we have no records, but in India we have several. Many years ago Bourdillon found a nest with two young birds near Mynall on the 14th April; since that time Bourdillon and Stewart in Travancore, Davidson in Khandesh and, recently, Phillips in Ceylon have taken nests and eggs.

Bourdillon's account of its nesting (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 672, 1904) reads:—"This fine Hawk, though resident, is by no means common. It keeps to the forest-clad hills and is

never seen away from them. It breeds in our forests at elevations of 1,500 to 2,000 feet above sea-level. I have twice taken their nests. On the first occasion I observed a bird fly off a nest about 30 feet from the ground, and as I had no cooli with me and the tree was not a difficult one I went up to the nest myself. The nest was a frame-work of sticks, larger at the bottom and gradually decreasing in size, with a lining of leaves, the last additions, which were those of the Iron-wood tree (*Messua ferrea*) being quite fresh. It measured 18 inches in diameter and contained two slightly incubated eggs. This was in March. The second nest, which I found in April, contained a couple of young birds."

Stewart obtained a good many clutches in Travancore and says that they breed from the foot-hills up to some 3,000 or 3,500 feet and nest on trees, sometimes in small ones with few leaves, sometimes in those which are very large and densely foliaged, placing the nest at various heights. They do not seem to mind much what species the tree is or how high, but they do show a predilection for trees standing near rivers or ponds. The lining seems to be almost invariably of green leaves, the birds generally choosing large and, very often, thick leaves, presumably because they retain moisture for a longer time.

In Kanara Davidson and Bell both obtained nests with eggs and young and the former, in *epistole*, says he generally found the birds breeding in broken ground on big trees, often in ravines. They found eggs in April and May, but Davidson was very unlucky in always finding them very hard-set. Elsewhere the breeding season seems to be from early March to late May, and in Ceylon also Phillips found two "quite fresh eggs in a nest of the usual type on a tree in a strip of jungle, on the banks of a river, on the 7th March." I have eggs in my own series dating from 2nd March to 25th May, both taken by Stewart, but the latter date is unusually late.

Two or three eggs are laid, two quite as often as three.

In appearance they are typical Goshawks, white with a bluish tinge, often much marked with stains but very rarely marked with any true pigment and then only of the faintest. The markings Bourdillon refers to—I have his eggs—are, I think, purely stains.

In texture and shape they are quite typical, a little rougher and coarser in texture than the eggs of *Astur badius*, but still fine and smooth for *Raptore*'s eggs.

Twenty-four eggs average 46.7×37.1 mm.: maxima 52.0×39.6 mm.; minima 41.5×36.0 mm.

They are usually very fierce birds in protecting their young, but individuals vary greatly. Stewart says in one instance "the birds sat by making no demonstration" and, in another, "the birds attacked again and again, swooping down quite close to the bill-man who was climbing the tree." In both instances there were fresh eggs in the nest, one clutch of two and one of three.

(1810) *Astur trivirgatus indicus* Pearson.

THE NORTHERN CRESTED GOSHAWK.

Astur trivirgatus rufitinctus, Fauna B. I., Birds, 2nd ed. vol. v, p. 155.
Astur trivirgatus indicus, ibid. vol. viii, p. 687.

The Northern form of Crested Goshawk extends over the whole of India North of the range of the previous race, but it is not found West of Garhwal. In Burma it occurs as far South as Northern Tenasserim and peninsular Siam and extends East through the Indo-Chinese countries to Formosa and Hainan.

Like the preceding bird, this is a frequenter of forests and keeps even more exclusively to them. There is not much one can add to what has already been written about the typical form, but a description of two nests taken by myself embraces most of what there is to say. In North Cachar we found it breeding from the foot-hills up to 5,000 feet, but more commonly at about 3,000 feet. One of the first nests I ever took was built on a big densely foliated tree at about 40 feet from the ground. The nest, nearly 20 inches in diameter by over 12 inches deep, which had obviously been occupied for several years, was built of sticks, mostly small but some, though only a foot or so in length, were about 2 inches in diameter. The egg-cavity was fairly deep and was well lined with leaves, withered when we found the nest but, presumably, fresh and green when first put in. The parent birds kept swooping at the Naga boy as he climbed the tree and several times swooped to within a foot or two of his head so, finally, I had to fire twice to drive them off. The nest was on a large tree standing in dense evergreen forest on the banks of the Laisung stream, the kind of situation we generally found the nests in.

In the Khasia Hills the bird was more scarce than in Cachar, not caring for the somhre Pine-forests, though it occasionally bred in them. I found one of their nests with young ones in 1908 and again in 1909, but succeeded in taking eggs in 1910, the birds laying and bringing up a second brood in the same nest. In 1911 and 1912 I was away during the breeding season. In 1916 one of my men again took eggs, but reported it empty the following year. In 1921, however, when passing the tree he found it occupied and took three eggs.

This nest was in a Pine-tree (*Pinus khasianus*) at about 40 feet from the ground, or rather above the little stream which it overhung. It was just like the other nest already described except that I twice found it well lined with green leaves which it must have provided after the eggs had been laid.

We found it really dangerous for the boys to climb trees for the nests of this Hawk and had almost invariably to fire shots into the air to scare the old birds, though once or twice these flapped away without making any demonstration.

The breeding season is March, April and May, and either two or three eggs are laid which are not distinguishable from those of the preceding bird though they average a good deal bigger.

Twenty eggs average 48.4×39.6 mm. : maxima 50.4×38.0 and 49.8×41.0 mm. ; minima 45.0×39.7 and 50.4×38.0 mm.

I have only seen one nest being repaired and in this case both birds were noticed bringing sticks to it. I cannot say if the male takes any part in incubation, but believe it does, as I have seen and shot one male as it left the tree in which the nest was concealed, there being then no signs of the female.

Accipiter nisus (Linq.).

THE SPARROW-HAWK.

(1812) *Accipiter nisus melanoschistus* Hume.

THE INDIAN SPARROW-HAWK.

Accipiter nisus melanoschistus, Fauna B. I., Birds, 2nd ed. vol. v, p. 158.

Breeding throughout the Himalayas from Baluchistan, where Ticehurst says it is a common resident in the Juniper-forests, through Nepal, Tibet, Sikkim to Eastern Assam, Burma, Yunnan and Setchuan.

It occurs during the breeding season at all heights between 4,000 and 10,000 feet, sometimes higher still and occasionally a little lower.

In Hume's 'Nests and Eggs' descriptions are given of the nidification of two species or races of Sparrow-Hawk, *nisus* and *melanoschistus*; both of which we may without doubt refer to the second race. Some individuals are with difficulty assigned to either one or the other, but the birds breeding within our limits, unless of the *virgatus* group, are all *melanoschistus*.

I have taken many nests of this Hawk myself in Assam; Whympers and Mackinnon took several in the Kumaon; Blair and Hume himself obtained nests at Kotegarh; Dodsworth, Jones and Thompson in Simla; Rattray, Buchanan and others in the Murree Gales and, finally, Cock, Ward and others in Kashmir. Williams also found a nest with four eggs near Quetta which he attributed to this species. Whitehead says that it breeds freely in the Tirah (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 306, 1912) when quoting Donald on certain methods of trapping this Hawk.

The Sparrow-Hawk is found nearly always either actually in forest or in exceptionally well wooded country, though it may also be seen hunting for its prey at odd times in quite open country. All the nests I have taken myself have been built on trees in forest, though in one or two cases the forest has consisted of a narrow

strip running between cultivation and a stream. This Raptore, like so many others, seems to prefer large trees with dense foliage growing on the banks of streams to any other, but I have seen more than one right in the interior of deep shady forest with no water, still or running, anywhere near them.

In India this Sparrow-Hawk almost invariably makes use of another bird's nest as a base for its own, even though that may consist of remnants only. Nests I have personally examined have been superstructures on those of *Corvus coronoides* sp., Green Pigeon sp., *Macropygia tusalia* and others too tattered and broken to show to what bird they had originally belonged. Sometimes when a Crow's nest is used it is merely enlarged and improved, a few sticks added and a lining of green leaves, or a few green twigs, placed in the egg-chamber. At other times, especially when Pigeons' nests are used, the original nest may not form a quarter of the completed home for the Hawks, who pile up twigs and sticks on the fragile foundation provided by the Pigeons. All the nests I have seen appear to have been based on those of other birds; Rattray and Buchanan have had the same experience, and they say also that the nests have been always on large trees, very high up, standing in deep forest. This trait is not referred to by other collectors nor has any one recorded such an instance in respect of the Sparrow-Hawk in England; yet in my own rather small experience of that bird I have seen two nests, one in Cumberland definitely built on a Crow's nest and the other in Norfolk equally obviously built on an old nest of a Wood-Pigeon.

Sometimes this Sparrow-Hawk makes its nest on ledges of cliffs. Hume says that an egg sent him by Mr. Blair was found on the 28th April in "a nest, a very slight one of sticks, placed on a ledge of a high cliff," and again he writes: "On the 29th May I obtained a second nest near the same place and very similarly situated."

The breeding season is during April, May and early June.

In 1917, before I had obtained or seen the wonderful collections of Whymper, A. E. Jones and others, I wrote (*Ibis*, 1917, p. 353) that I had never seen a clutch of more than four eggs. This number seems to be true of Cachar, but in the North-West Himalayas clutches of five are common, while I have also received one of six eggs from the Khasia Hills.

The eggs are indistinguishable from those of the European Sparrow-Hawk, though as a series they are, perhaps, not quite so handsome. The ground is white, sometimes suffused with buff, reddish or greenish-blue, and the surface is generally boldly blotched with deep reddish-brown to deep blackish-brown. Some eggs are freckled rather than spotted or blotched, while occasionally the marks are smudges or small clouds. The secondary markings are of pale reddish-brown, sienna or pale lavender-grey. As a rule these are scanty or wanting altogether, but in a few, especially the smudgily marked eggs, they are more numerous. Many eggs

get stained in the nest, probably from some colouring matter in the green leaves of the lining.

In shape the eggs are broad ovals, the texture fairly fine, the surface smooth and rarely with a faint gloss.

Sixty eggs average 39.1×32.6 mm. : maxima 40.3×32.0 and 40.0×33.0 mm. ; minima 36.0×30.6 and 38.9×29.0 mm.

Both sexes take part in the construction of the nest, though the male seldom does more than bring the materials for his wife to use. He takes no part in incubation, but may be generally seen near the nest unless absent procuring food. Incubation in the English Sparrow-Hawk is said to take thirty-four to thirty-five days (Owen, 'British Birds,' vol. xii, pp. 61 & 74), but I do not think the eggs in India take more than thirty, at the most thirty-one, days to hatch.

The male frequently feeds the female when she is incubating, and when he brings the food she comes either to the edge of the nest or to an adjoining branch to receive it and eat it. During the heat of the day the eggs are often left uncovered. The birds demonstrate when their eggs are being taken and keep on swooping towards the thief, but I have never known them do more than this. If their nest is handled they usually desert hut, on the other hand, I have known them continue to lay in the same nest after eggs have twice been taken from it. They do not normally use a nest for more than the one season.

Accipiter virgatus (Temm.).

THE BESRA SPARROW-HAWK.

(1813) *Accipiter virgatus besra* Jerdon.

THE SOUTHERN BESRA SPARROW-HAWK.

Accipiter virgatus besra, Fauna B. I., Birds, 2nd ed. vol. v, p. 159.

This little Sparrow-Hawk is found over the greater part of South India and in Ceylon. It is common in Travancore and on the Malabar Coast but seems to be very rare elsewhere. There are two quite typical skins in the British Museum Collection from Mhow, two more (probably wrongly labelled) from Bengal and another from "Madras."

This is a bird of forests, and in most places of deep evergreen forests between 2,000 and 4,000 feet or higher. In Travancore, however, Stewart found them breeding sometimes in deciduous, sometimes in evergreen forest, while once or twice he took nests from Para Rubber-trees in Rubber Estates, though it must be noted that these were surrounded by forest. In Ceylon also Parker found a nest, containing one chick, built in a "small Tamarind-tree overhanging the main road. It was about 35 feet from the ground in a vertical fork among the small twigs on the top of the tree, and in appearance resembled the ruins of a Crow's nest." Phillips, who also obtained a nest with three eggs in Ceylon, says that the nest

"was one of sticks placed in a tall tree in heavy hill-side forest, at an elevation of 3,500 feet."

Stewart's notes show that in the great majority of cases the birds build inside forest, though they often select high trees growing on, or close to, a stream. The nest is built at a great height and is nearly always that of some other bird repaired, added to and lined with green leaves and supple twigs. Occasionally a most ragged old nest is made use of and no repairing seems to be carried out, while at other times the birds make a nest for themselves. Every pair has its own territory, no other Sparrow-Hawks being allowed to enter it during the breeding season. They are bold little birds and attack any intruder fiercely, human or other, who ventures to rob their nest; yet they are not inclined to desert their nest if the eggs are actually taken, and will often lay again.

The breeding season lasts from January to May, but most eggs are laid in March and April. The normal clutch is three or four, and five only very exceptionally, though Stewart has twice taken five, one of these two clutches containing three normal and two pigmy eggs.

The eggs can, of course, all be matched by the eggs of other Sparrow-Hawks but, taken as a series, they have a very clean, brightly marked appearance, while the beautiful type with cloudy markings is comparatively more common in the eggs of this species than in those of the *nisus* group.

I have one clutch of four (Stewart) with deep pure vandyke-brown blotches and with a fair number of inky secondary markings. In this the blotches are huge, but in another clutch, otherwise similar, they are much smaller. Another clutch has lilac undermarks with a few large blotches of blackish-brown at the larger end. Yet another has the primary markings obsolete and the beautiful lilac secondary blotches more numerous. Occasionally one comes across odd eggs in clutches which are white or nearly so, or else are faintly smeared and clouded with very faint sienna-brown, looking more as if stained than really pigmented.

Sixty eggs average 36.9×29.7 mm.; maxima 41.1×31.3 and 38.6×31.9 mm.; minima 34.4×28.2 and 34.7×27.8 mm.

(1814) *Accipiter virgatus affinis* Hodgs.

THE NORTHERN BESRA SPARROW-HAWK.

Accipiter virgatus affinis, Fauna B. I., Birds, 2nd ed. vol. v, p. 161.

This Besra breeds throughout the Himalayas from the extreme West to Yunnan and the Western Chinese mountains. It occurs and breeds in the hills of Assam, both North and South of the Brahmapootra, and in the Chin, Kachin and Shan States Hills. La Touche also gives it as occurring in Formosa and South-East China ('Birds of Eastern China,' vol. ii, pt. 3, p. 198).

During the breeding season I have only found this Sparrow-Hawk frequenting either deciduous forest with much evergreen undergrowth and many creepers and parasites or really dense evergreen forest, and this for the most part in very rugged country. For nesting purposes they seem to love a tree in some narrow valley between precipitous hills and with a stream, big or small, running close by. Often the tree selected will be one on the sides of the hills or, occasionally, one growing on the sides of a real precipice. In these latter cases the tree may be small and the nest ill-concealed, but typically it is built in some great, thickly foliated tree in which it is very effectually hidden. I think it is more often to be found above 40 feet from the ground than under, and I have known one nest at 80 feet, while Jones also records a nest taken near Simla built "60 feet up in a Deodar" (Journ. Bomb. Nat. Hist. Soc. vol. xxxv, p. 208, 1931). I have also seen the eggs deposited in nests which had been built in creepers such as the Elephant-creeper. I have never seen a nest which had certainly all been built by the Hawks themselves. They make use of other birds' nests, or the remnants of nests, and then adapt these for their own use. Their favourite nest is undoubtedly that of the Jungle-Crow, and in the North Cachar Hills these Crows make such beautiful compact nests of moss, small sticks etc. that the Hawks seldom did more than place a few green leaves in the lining. I have also known them use old nests of various Pigeons, of *Cissa chinensis*, of a Thrush, probably *Cochoa*, or of squirrels. These Hawks breed over a wide range of elevation, for I have taken a nest as low as 3,000 feet and as high as 6,000 feet. Whymper took a clutch of eggs from an old nest of a Crow in Kuman at 2,000 feet, while Matthews obtained a clutch near Bhim Tal which, although he does not give the elevation, must have been far higher than that of any nest taken by myself. Mackinnon also took eggs at Mussoorie at about 6,000 feet, and I saw birds breeding in the Naga Hills above Henema at at least 7,000 feet, while Jones took a nest near Simla with four eggs at about this latter elevation.

Individual birds vary very greatly in temperament. Some desert their nest even if it is only examined and not touched; others will continue to lay after the first and second eggs have been taken or will lay a second clutch in the same nest when the first has been robbed. In the same way some are most brave and persistent in defending their homes, while others slink away without any fuss. Matthews writes (Journ. Bomb. Nat. Hist. Soc. vol. xxv, p. 497, 1919):—"On May the 9th at Bhim Tal I found a nest of this bird in a tree about 20 feet from the ground, overlooking a *khud*. The nest, made of sticks of various dimensions and about 18 inches across, contained two fresh eggs, which I took. Three days later the nest contained another egg. The birds showed the utmost concern when the nest was being robbed and flew and swooped at me again and again, compelling me to ward them off with my

hand. At intervals they would settle about 3 or 4 yards away, screaming the whole time, and then would attack with renewed vigour."

When examining nests or taking eggs myself I have found some birds attack one continuously all the time one is climbing to the nest while, if the contents are taken, they sometimes continue their attacks during the descent also and even follow one up for some distance, screaming all the time. Other birds flutter round screaming but make no real attack, while others again slip off the nest and fly quietly away.

Most eggs are laid in April and May but an occasional bird may lay in the end of March, while Mackinnon once took three eggs on the 16th June. The lower the elevation the earlier nidification begins, and in the lower Chin Hills Mackenzie and Hopwood found no nests with eggs after the 24th April. They lay from three to five eggs which cannot be distinguished from those of the Southern Besra and are equally beautiful. In addition to the types already described I have a clutch of three in which two eggs are clouded, freckled and spotted with dull pale reddish but the third is blotched with plum-brown with numerous underlying blotches of lavender and lilac.

Sixty-eight eggs average 38.2×30.5 mm. : maxima 40.4×30.8 and 38.3×32.2 mm. ; minima 34.3×20.6 and 38.4×28.8 mm.

Accipiter gularis Temm. & Schleg.

THE SPARROW-HAWK.

(1817) *Accipiter gularis nisoides* Blyth.

THE INDO-CHINESE SPARROW-HAWK.

Accipiter gularis nisoides, Fauna B. I., Birds, 2nd ed. vol. v, p. 164.

This small form of *gularis* is found from Fokhien in Southern China, through the Indo-Chinese countries, to Southern Burma and the Andamans, while to the South it occurs in the Malay States, Sumatra and some of the other islands.

Nests and eggs of this Sparrow-Hawk have been taken by Wickham in the Andamans and by Hopwood and Mackenzie in Tavoy. The first writes (Journ. Bomh. Nat. Hist. Soc. vol. xix, p. 992, 1910) :— "House-Crows not having been sentenced to transportation, an untidy collection of sticks in the fork of a Rain-tree, although overhanging a road to a small village, attracted my attention early in March this year ; it contained nothing, but was noted for future inspection. On the 21st March I visited the spot again and found it contained two fresh eggs of the Besra Sparrow-Hawk ; thinking this was probably the full complement for the Andamans, as birds who should know better often play this trick on collectors

here, I took them, but secured another egg on the 28th, my first bit of good fortune.

"The jungle round here was a favourite hunting-ground and I had noticed another stick-nest in a rain-tree not 100 yards from the nest I had taken the Sparrow-Hawk's eggs from, and it was during one of my subsequent visits that I found my little pair of Hawks were repairing this old home of theirs, and on the 28th April I took four eggs slightly incubated.

"The pluck of these little Hawks in defence of their nests is wonderful, as they swoop down on the marauder, and once struck my topee as I was watching the man at the nest, both male and female taking part in the attack; but they also have patience, as this pair returned to their first nest and hatched out their brood on the 14th June."

Hopwood twice obtained nests in Tavoy, concerning which he wrote me:—"c/2 *Accipiter virgatus*? I think you may like these two, as they are small feebly marked eggs, very different from those of the Northern *virgatus* and, perhaps, of a type new to you. They were taken in an old *Carpophaga* nest. I have also an exactly similar clutch of four taken from a Jungle-Crow's nest, while in another old nest of a Crow I found a brood of four young birds, one of which I caught and now have in an aviary."

The clutch of four was taken on the 16th April and the pair of eggs on the 25th.

From the above it will be seen that the birds breed principally in March and April, but Wickham took one pair of eggs and Osmaston others in the Andamans late in February.

The eggs are quite typical Sparrow-Hawks' eggs but are very small and very feebly coloured. The ground is white, rather dull, with faint blotches of sienna or reddish-brown and with still paler secondary blotches of neutral tint. One set of Wickham's is rather better marked with rather rich red-brown blotches confined to the larger or, in one case, to the smaller end.

Fourteen eggs average 36.7×29.5 mm. : maxima 38.9×31.1 mm. ; minima 33.2×26.0 mm.

***Pernis ptilorhynchus* Temm.**

THE JAVAN HONEY-BUZZARD.

(1819) ***Pernis ptilorhynchus ruficollis* Lesson.**

THE INDIAN CRESTED HONEY-BUZZARD.

Pernis ptilorhynchus ruficollis, Fauna B. I., Birds, 2nd ed. vol. v, p. 167.

This beautiful Buzzard is resident in Ceylon and all over India North to the Himalayas. It is rare in the Punjab but has been recorded as occurring in Sind by Blyth (Str. Feath. vol. i, p. 103).

It is comparatively common in Bihar, extending through Assam into Northern Burma, where it has been recorded as far East as the Ruby Mines district by Harington and the Southern Shan States by Cock.

Although really a resident non-migratory bird, it moves about locally under the influence of food-supply. Thus Currie says that it only visits Lahore during the breeding season and, again, it appears to be found in Panchmari only when the bees are there to furnish it with its daily diet.

The Honey-Buzzard, though it may be occasionally found in thin and deciduous forest and still more rarely in evergreen forest, is a bird which by preference haunts well-wooded open country, both cultivated and waste, and frequently breeds in gardens, compounds, factory surroundings and in the vicinity of villages. It ascends the hills up to at least 4,000 feet but, even in these, it generally frequents rice-fields and cultivation patches round villages or grass-covered hillsides merely dotted with trees, singly or in small clusters.

In Bihar, where they are more numerous than in any other part of India known to me, most birds made their nest in solitary Mango or other trees in indigo or other cultivated tracts, though a few build in gardens and others in Mango-groves. Inglis and Coltart, who obtained a really wonderful series of the most beautiful eggs of this Buzzard, found nests in very many kinds of trees. Both certainly found more in Mango-trees than in any others, but they recorded nests in Peepul, Banyan, Casuarina, Siris, Tamarind, Jack Fruit, Coconut-palms, Date-palms, Babool and other Acacias and in some others the names of which were not noted. Marshall found nests also in Toon-trees (*Cedrela toona*) and in Sheeshums (*Dalbergia sissoo*), while Blewitt added the Neem-tree to the number of those occupied.

The nest is usually placed fairly high up in the tree selected, most often between 20 and 30 feet, but many are much higher and a few are lower. Inglis records one at 15 feet in a Mango and Blewitt one in a Sheeshum at 16 feet, while I have seen one at about 12 feet in a Mango, resting in a deep fork made by three large boughs. A nest taken by Coltart from a tree in his garden was right up in among the quite small branches of the tree, but two out of three nests, or an even greater proportion, are placed on big branches and forks in the upper half of the tree chosen.

I believe it is exceptional for the Honey-Buzzard to make use of other birds' nests for breeding purposes, but Coltart took two eggs from an old Kite's nest in his garden, and gives the following interesting account of another pair of birds usurping the nest of a Shikra (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 545, 1906):—
“A pair of these birds had been under observation of my friend Mr. N. L. Hervey and myself for some weeks and had laboriously completed a very nice nest high up in a Tamarind-tree in a compound.

Fifty yards away in a Sissoo-tree was a nest of a Shikra (*Astur badius*) from which we removed two eggs on April the 23rd. To our surprise, and for no apparent reason, on May 5th the Honey-Buzzard deserted her own capacious home and transferred her headquarters to the deserted nest of the Shikra, piling in her furniture, in the shape of green leaves and additional sticks, with a feverish haste, which was in marked contrast to the leisurely manner in which she and her mate had built their own nest. On the following day she laid a particularly handsome egg, but a cyclone visited the district on the next day and it was blown from the nest.

"Since I wrote the above the Shikra has returned to her original nest and has laid two eggs. The Honey-Buzzards, probably the same two individuals, have built again in the same compound and we are now (14th June) anxiously awaiting the next move."

Normally they construct their own homes, untidy stick affairs, with a good lining of green leaves, sometimes mixed with grass. Marshall (G. F. S.) gives a good description of a thoroughly typical nest:—"The nest is situated in the short fork of a tree, generally about two-thirds of the way up. The nest is cup-shaped in the first instance but so filled up with the lining as to appear more like a flat platform. It is a compact structure composed entirely of twigs, and lined with a thick layer of dead leaves, chiefly sheeshum-leaves, almost filling up the hollow space; in one instance I found the nest lined with perfectly fresh green leaves, and as there were two eggs in it the lining must have been partially renewed after the eggs were laid. The outer diameter of the nest is about 16 to 18 inches and of the egg-receptacle about 10 inches; the depth of the structure including lining is about 9 inches.

"The bird is rather familiar in its habits and by no means shy; I took three of its nests from compounds in the station and three more from the compounds of canal chowkies."

That the bird is not shy seems to be generally accepted, but this is not always so, for Inglis says that in the breeding season he considers them to be shy birds and that they quickly desert their nests (Journ. Bomh. Nat. Hist. Soc. vol. xiv, p. 589, 1893).

The breeding season is April, May and early June, but in Southern India more birds lay in February than later, and again in Dacca I took a pair of eggs on the 10th of that month. On the other hand, Blewitt took eggs as late as the 10th July at Hansie.

The clutch numbers two but occasionally a single egg may be laid and incubated. As regards description, it would take pages to do justice to these most beautiful eggs, their wonderful variety and range of coloration.

In shape they are broad ovals, practically the same at both ends, the surface is smooth and rarely faintly glossy, but the texture is rather coarse.

As a series they are not like the eggs of the European Honey-Buzzard, though a few individual eggs may be indistinguishable.

Most eggs have a ground-colour of pale cream, pale reddish-buff, reddish or yellowish-buff. The markings vary so greatly that I give descriptions of certain types between which every intermediate form also occurs :—

- (1) Like the English *Pernis*, a very rare type, ground pale cream or reddish, the whole surface blotched, mottled and clouded, sometimes so thickly as to practically obliterate the ground, with deep blood-red, red-brown or chestnut-red. Occasionally in this type there are a few still deeper spots and lines of the colour of clotted blood or black.
- (2) Pale cream ground mottled with reddish-brown or chestnut-brown, very like a Kestrel's egg, the extent and depth of colour of the blotching varying to the same extent.
- (3) Pale salmon-buff or pale stone-buff, lightly freckled all over with reddish.
- (4) Pale reddish or buff, with brown markings varying in depth from light sienna-brown to deep chestnut-brown or vandyke-brown. Many of these are exactly like common types of the Sparrow-Hawk, some even having the pure white ground usual in the eggs of that species.
- (5) White, with a faint indication of some shade of reddish or buff, freckled, mottled or blotched with sienna-brown, pale or dark, with numerous underlying blotches and cloudings of lavender.
- (6) Any of the above tints of ground-colour, with beautiful cloudings and smears of deep brown or reddish-brown and secondary markings of grey, the two running into each other and often blending. A very beautiful type.
- (7) Practically uniform brick-red, the tiny red freckles so numerous as to entirely obscure the ground-colour.

In all the above types there are sometimes observable hair-lines, hieroglyphics etc. of deeper, darker colour, generally almost black. As a rule the markings, whether numerous or scanty, are distributed fairly evenly over the whole surface, but in a minority of eggs, more especially those which are clouded and smudged, they are entirely or partly confined to the larger end.

I have only seen one egg which was pure white.

The eggs when specially poorly marked might be mistaken for Kites' eggs, but the inner membrane is yellow *always* and never green, as it is in the eggs of the latter.

Eighty eggs average 52.8×42.8 mm. : maxima 57.0×45.3 and 53.2×45.5 mm. ; minima 49.5×43.0 and 50.0×39.0 mm.

Both sexes incubate and both assist in making the nest, the male actually incorporating the material into the nest as well as bringing it to the female. I do not know how long incubation lasts, but it is not less than thirty-two days, as a pair of eggs found on the 3rd May had hatched on the 4th June and may have been laid

earlier than the date when found. The parent birds, especially the female, sit very close and sometimes refuse to move even when things are thrown at them. They are, however, undemonstrative when their eggs are taken and never attack a human intruder, though they will drive Crows and other avian trespassers away from their domain.

Baza leuphotes.

THE BLACK-CRESTED BAZA.

(1822) **Baza leuphotes leuphotes** (Dumont).

THE INDIAN BLACK-CRESTED BAZA.

Baza leuphotes leuphotes, Fauna B. I., Birds, 2nd ed. vol. v, p. 171.

The Indian Baza is found in the Suh-Himalayas from Nepal to Eastern Assam, North of the Brahmapootra and then again in Travancore and Ceylon. It is a bird of the lowest hills and Terai country but has been found breeding as high as 4,000 feet and possibly higher. A. M. Primrose found it breeding on the Longview Tea Estate near Kurseong, and in Travancore Stewart obtained its nest frequently at about 2,000-2,500 feet.

It is essentially a forest bird, yet it loves best forest through which broad streams make their way or where there are wide open glades and spaces, either natural or made by the haphazard efforts of the hill tribes to cultivate the land. It may also be found in the broad strips of jungle and forest which intersect the bigger tracts of rice cultivation in the plains near the hills, or which, in the hills themselves, divide streams from mustard-crops etc. Here, both during the breeding season and at other times, they may be observed soaring at no great height in small circles or flapping along like Crows with ample leisure from one patch of forest to another. In the breeding season, of course, the birds will be single or in pairs, at other times in small family parties of four or five.

For nesting purposes they choose generally the highest tree they can find in the jungle they have selected for breeding purposes, the few nests I have seen and taken myself having all been thus situated. One of the first nests I ever saw was built in a *Bombax* tree which, though not big for its species, was tall enough to tower over the surrounding trees, while the nest, fully 60 feet from the ground, was conspicuous from the hill above. Another nest was in a swampy piece of forest near a Tea-Garden, with dense undergrowth and matted cane-brakes all round, making it difficult to get near the tree, which represented a tough climbing job even when one arrived at the base. In this tree, I believe an Iron-wood of some sort, the nest must have been 80 feet from the ground, and we were two days before a small boy eventually succeeded in taking the eggs, the climbing necessitating a cane and bamboo ladder

being made up the first 30 or 40 feet, and then cane loops over the big boughs to help the boy up another 20 feet.

Primrose, however, found the nest twice, once on a small sapling in the Gooma Reserve and once on a big tree near Kurseong, both times only 25 feet from the ground and easy to get at. His nests also were found in heavy forest, though once it was close to the open ground of a Tea Estate. Most of the nests seen by me and the Gooma nest taken by Primrose were near water, either running rivers and streams or swamp and pools.

The nests are small well-made affairs of small sticks, measuring between 10 and 15 inches in breadth by about 4 to 8 inches in depth. The sticks used are from 4 to 6 inches in length, with half a dozen or so twice as long again. In thickness few are thicker than a lead-pencil and many still thinner. The egg-cavity is about 8 inches across and 2 to 4 inches deep, being generally well lined with grass or fibre over which there is a mat of green leaves, which are renewed from time to time until incubation is far advanced.

The breeding season in Northern India is from April to June but, in the South, Stewart found most eggs in March and April, while he took eggs as early as February 10th and as late as July 4th.

The eggs number two or three, though Stewart once obtained a single egg much incubated.

The eggs of the Bazas closely resemble those of *Astur*; in colour they are grey-white, becoming much stained from the leaves they lie on. Very few eggs have any real pigment on them, though sometimes it is hard to distinguish between stains and true pigmentation. Of the three eggs taken by Primrose on the Longview Estate one has a bold long blood-stain down one side while a second has blood-stains like marbling over most of the surface, the third egg being pure grey-white. A pair taken by myself has fairly definite reddish blotches and specks, sparse and confined to the larger end.

In shape the eggs are broad ovals, the texture fairly fine and the surface smooth, but rather less so than in the eggs of *Astur badius*.

Twenty-four eggs average 37.4×31.1 mm. : maxima 46.0×31.0 and 39.1×32.1 mm. ; minima 34.9×29.5 and 36.5×28.9 mm.

Both sexes incubate and both help in the construction of the nest, but I have no idea how long incubation lasts. I have never seen the birds attack a human intruder, but once one of a pair which was having its nest rifled sat on a bough close by and softly squealed at the boy as he climbed up and then flapped slowly away when he reached the nest.

(1823) *Baza leuphotes burmana* W. L. Slater.

THE BURMESE BLACK-CRESTED BAZA.

Baza leuphotes burmana, Fauna B. I., Birds, 2nd ed. vol. v, p. 173.

This Baza occurs and is resident in Assam South of the Brahmapootra, Burma, Siam, Indo-China and the Northern Malay Peninsula.

Kloss records it from Siam (Ibis, 1918, p. 88), Robinson and Kloss another female from Annam (*ibid.* 1919, p. 416), both these ornithologists remarking on its commonness in peninsular Siam (Journ. Siam Nat. Hist. Soc. vol. iii, 1919).

There is practically nothing on record about the breeding of this Baza. Hauxwell obtained three eggs from a nest on a tree in the Thoungyin Valley on the 30th April, while I found a nest containing two eggs on the 23rd June in Sylhet. The nest in this instance was exactly like that of the Indian form, a cup of small sticks, lined with green leaves and measuring about 10 inches across by about 4 deep. It was placed about 50-60 feet from the ground in a high tree growing in a dense strip of forest, with heavy undergrowth, beside a wide stretch of rice cultivation and grassland.

The two eggs are probably unusual, as one has two large blotches and one small red-brown blotch at the larger end, while the other has a faint stippling of red at the smaller end and two or three freckles at the larger end. The eggs taken by Hauxwell were said to have been white, but I have no measurements for these. Those taken by myself measure 38.2×31.8 and 39.1×31.4 mm. They are of the usual Baza shape and texture.

Baza jerdoni.

THE BROWN BAZA.

(1824) **Baza jerdoni jerdoni** (Blyth).

THE NORTHERN BROWN BAZA.

Baza jerdoni jerdoni, Fauna B. I., Birds, 2nd ed. vol. v, p. 174.

This fine Baza is found in the Eastern Himalayas from Sikkim to Northern Burma, whence it extends South to Malaya and Sumatra and to Borneo.

This Baza haunts much the same kind of country as the preceding two smaller birds, but it does not breed in the plains, being found in the outer ranges of the Himalayas during the breeding season between 2,000 and 6,000 feet, while in Winter Primrose met with it as low as 1,200 feet. In 1910 a pair of birds haunted a tree in the Longview Tea Estate and showed signs of starting breeding but, after a time, they deserted. Again, in 1911, the birds came and left without breeding, but in 1912 they returned and selected a tree standing in the Tea, close to the edge of the jungle. The tree was one of great size and the birds placed their nest at about 30 feet from the ground in among the stouter branches. The nest was a small compact one of sticks lined with green leaves, and on the 12th April contained two eggs, but the female then stopped laying, so the eggs were taken. In appearance they are just large editions of the eggs of the Black-crested Baza, white

when first laid, with a faint grey tinge and much stained, although they had been so short a time in the nest.

The only other eggs I know were a pair taken by F. Morrison on a Tea Estate below Darjiling, the elevation being about 6,000 feet. The nest, the description of which agreed well with that taken by Primrose, was built on a large forest tree at a height of nearly 60 feet from the ground, the female being shot off the nest which, on 17th June, contained two hard-set eggs.

The four eggs measure 44.8×35.0 , 44.0×36.7 , 44.3×37.2 and 45.7×37.0 mm.

(1825) *Baza jerdoni ceylonensis* Legge.

THE CEYLON BROWN BAZA.

Baza jerdoni ceylonensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 175.

This race has a far more restricted area than the Northern one, being found only in Ceylon, Travancore and the Wynnad, a young bird having been obtained in the latter district.

So far as its nidification goes one has to rely almost entirely on Stewart's notes on its breeding in Travancore. Dobson obtained two eggs in February 1929 near Talawakile from a nest about 50 feet up on the top of a jungle tree. Except for this no nests seem to have been taken other than those found by Stewart.

He describes the nests as well made but rather small structures of sticks lined sometimes with grass and roots, but always also with green leaves. These nests may be placed at any height from the ground between 20 and 60 feet, sometimes in quite small saplings and sometimes in huge forest trees. The nests are apparently never placed in the very small branches in the top of the tree, or close to it, but in the larger branches halfway up or rather more. The tree selected, whatever its size, is always in forest, and the birds undoubtedly prefer evergreen forest in very broken hills; twice Stewart speaks of trees being chosen in or near ravines and more than once of the tree being near a stream and, whatever the forest may be, the birds evidently prefer open glades or spaces inside the forest, though in some instances the nests were found in deep forest with thick and tangled undergrowth.

The breeding season lasts from early February to the end of April, though few eggs seem to have been found after the first week of this latter month.

Either two or three eggs are laid, equally often two as three, and these cannot be distinguished from those of the Northern bird, though a big series of the latter would almost certainly average larger.

Thirty-two eggs of this form average 44.9×33.6 mm.: maxima 46.4×36.2 and 46.3×38.1 mm.; minima 41.1×35.9 and 42.0×35.0 mm.

Order IV. COLUMBÆ.

(PIGEONS and DOVES.)

The great majority of Pigeons and Doves lay pure white eggs, in shape either elliptical or long ovals, with one end very little larger or smaller than the other. The texture is fine and very close, the surface smooth and glossy to very glossy. The inner membrane is white. Unless, therefore, these features do not apply the eggs of each species will not be dealt with individually.

Family COLUMBIDÆ.

(PIGEONS and DOVES.)

Subfamily TRERONINÆ.

(GREEN PIGEONS.)

Crocopus phœnicopterus.

THE GREEN PIGEON.

(1826) *Crocopus phœnicopterus phœnicopterus* (Lath.).

THE BENGAL GREEN PIGEON.

Crocopus phœnicopterus phœnicopterus, Fauna B. I., Birds, 2nd ed. vol. v, p. 181.

This very lovely bird is found all along the lower hills and base of the Himalayas from Oudh and the Jumna River to Eastern Assam both North and South of the Brahmapootra. In the Punjab it is rare and it is not common even in the drier parts of the United Provinces. South it is a straggler as far as Central India and Orissa and is extremely common in Bengal and Bihar. Like all the Green Pigeons, it is a bird of well wooded areas, but it is found alike in deep evergreen forest up to 2,000 feet, the dense tangles of undergrowth and tree-jungle all along the Terai and, again, in cultivated lands, the vicinity of villages and towns and even in gardens and parks.

Exceptionally it is found up to 4,000 feet in the hills, and I have seen it at this elevation in the Khasia Hills, while it has been noticed at similar heights in the Darjiling district.

The nest is a typical Pigeon's nest of small twigs forming a flat platform about 6 to 8 inches across and 1 to 2 deep. The twigs are placed criss-cross and the whole fabric looks as if a breath of wind would hurl it to the ground. They are, however, a good deal

stronger than they look and, in spite of the exposed positions in which they are often built, stand a good deal of wind and shaking before they come to grief. Generally the nests are placed in small trees and saplings at no great height from the ground, but this is not always the case, and it sometimes makes its home in very large trees, such as Mango-trees, both solitary and in groves. Hume, Cock, Marshall, Inglis and Coltart have all taken eggs from nests built in Mango-trees, and they have also been known to breed in Jack, Tamarind, Mulberry and Banyan.

Cock, writing from Seetapore, says the nest is "frequently placed on an excrescence, or where some parasitic plant shoots out and thickens the foliage, so as to render the bird more difficult to be seen," while McMartin, writing from Chikalda, describes just the contrary. He remarks that the nest is "placed haphazard at the end of a branch, but from this cause it is exceedingly well concealed, as the bough selected always appears to be a bare one, on which the dry twigs do not attract attention." The sitting bird, however, would be very conspicuous, and though both Cock and McMartin are correct in their facts, I think the true significance is that these very confidential little Pigeons do not much mind where they build their nests or whether they are well hidden or not.

This Pigeon is an early breeder, most birds laying in March and the first half of April, while many lay on until May and June, and I have actually taken fresh eggs on the 26th August.

As usual with this order two eggs form the normal clutch, though once Inglis took three from the same nest and, rarely, one egg only is laid.

One hundred eggs average 31.8×24.4 mm.: maxima 35.0×26.1 mm.; minima 28.4×22.6 mm.

The birds sit very close and will often allow an approach to within a few inches before slipping off the nest.

Occasionally the birds breed in company. Two or three times I have found nests on adjoining trees and once three nests quite close together, while Inglis found three nests all on the same tree.

Incubation takes thirteen to fourteen days and both sexes take a part in it, the male sitting mostly by night and the female by day. Both sexes also help to build the nest.

The courtship of the Green Pigeons is typical of the family. The male bird puffs out his throat and breast, lowers his wings and then prances solemnly up and down a branch, continually bowing his head and whistling softly as he makes his way backwards and forwards to and from the lady he imagines he is captivating. Unlike most birds the female does occasionally condescend to cease feeding and spend a moment or two admiring the display, and will sometimes even join in the show and perform a brief skirt-dance on her own. The display is exactly the same, so far as I have seen, in every species of Green Pigeon, and the description given for this one suffices for all.

(1827) *Crocopus phœnicopterus viridifrons* Blyth.

THE BURMESE GREEN PIGEON.

Crocopus phœnicopterus viridifrons, Fauna B. I., Birds, 2nd ed. vol. v, p. 183.

This race of the Green Pigeon is distributed from Manipur and the Bengal districts East and North of the Bay of Bengal, throughout Burma, as far South as Moulmein and East into Siam, where, however, it merges into *C. p. annamensis*, which replaces it in Eastern Siam.

The type of country, elevation etc. frequented by this bird seems to be exactly similar to the haunts of the preceding bird, but it does not seem to wander up the hills much above 2,000 feet, though Livesey has taken eggs at Loilem, in the Southern Shan States, at about 5,000 feet.

No separate description of nests and eggs is needed, nor could they be distinguished from those of the preceding or of the next bird. As regards site, all that one can say is that both Harington and I have found nests in hamboo-clumps and in cane-brakes as well as in trees and hushes. Oates and Bingham both obtained nests in Burma, the former in Pegu the latter in Tenasserim, and since then many other collectors have taken them in various other parts of Burma.

The most usual breeding months seem to be March and April, but I have received eggs taken in June from the Chin and Kachin Hills and also from Tenasserim.

Harington, writing of the way this Pigeon refuses to leave its eggs and nest, remarks:—"I have taken only two nests, both at Taungyi during April. The first was placed about 10 feet up a small bushy tree growing on the side of a steep hill, so that one could look into the nest from a very few yards off. The old bird sat very tight, and as she was required for identification I had a shot at her head, knocking it clean off, so that it hit my orderly who was standing below and, for the moment, he thought that I had missed the bird and shot him instead."

Forty-four eggs average 31.8×23.8 mm. : maxima 33.4×24.1 mm. and 33.3×24.3 mm. ; minima 29.8×23.0 mm. and 31.1×22.0 mm.

(1828) *Crocopus phœnicopterus chlorogaster* (Blyth).

THE SOUTHERN GREEN PIGEON.

Crocopus phœnicopterus chlorogaster, Fauna B. I., Birds, 2nd ed. vol. v, p. 184.

The Southern Green Pigeon is found in Ceylon and over the whole of Southern India South of the range of the Northern bird, into which it gradually merges. West it occurs in Rajputana and North into the Central Punjab, while on the East it is found in Orissa and South Bihar. In the South of the United Provinces this is, perhaps, the most common race, but many birds here are intermediate, and

practically typical specimens of each race are found far inside the areas occupied by the other.

Hume says that this Green Pigeon breeds from March to June, and adds: "It certainly has two broods, perhaps more."

The only note in regard to its breeding which infers that it is in any way different to that of the two other races is Blewitt's. He writes:—"The nests were placed on toon, shishum, neem and keekur trees, mostly growing on the canal bank, at heights of from 14 to 18 feet from the ground.

"They are composed of shishum, *Zisypheus*, and broken twigs, in some cases slenderly, and in other cases somewhat densely, put together.

"One or two were absolutely without lining, but they were mostly very scantily lined with leaves, feathers or fine straw. They varied from 5 to 7 inches in diameter and from $1\frac{1}{2}$ to 3 inches in depth" (the italics are mine.—E. C. S. B.).

I can find no other record of a lining to a nest, but I have occasionally seen a feather in the nest of the Bengal bird, not a soft feather used for lining but a large stiff one used as a twig.

March and April are the favourite breeding months, but Stewart took eggs in Travancore in January, while Osmaston took others in Bareilly on the 19th May and Betham took eggs up to the end of that month in Ferozepore.

Forty eggs average 31.8×24.6 mm.: maxima 37.0×24.2 and 34.1×25.3 mm.; minima 30.0×22.6 mm.

Dendrophassa pompadora.

THE POMPADOUR GREEN PIGEON.

(1829) *Dendrophassa pompadora pompadora* (Gmelin).

THE POMPADOUR GREEN PIGEON.

Dendrophassa pompadora pompadora, Fauna B. I., Birds, 2nd ed. vol. v, p. 185.

This Green Pigeon is confined entirely to Ceylon.

It is essentially a forest and jungle bird, occurring both in the plains and in the hills up to about 4,000 feet.

W. Jenkins took several nests and eggs for me in Ceylon, where Wait and Phillips have since taken many more. The nest is exactly the same as made by others of the Green Pigeon group. As a rule the birds seem to prefer quite small trees and even high bushes in which to build their nests. One of the nests taken by Wait, which contained a single hard-set egg, was "6 feet from the ground, in among the twigs of a bush close to a path on the outskirts of a village, the bush growing in the usual low-country forest." Some of the eggs taken by Jenkins were in nests built "on bushes not five feet from the ground but quite well concealed, the nests so

trivial that they looked as if they could never support the eggs, much less the young when hatched." On the other hand, Wait has taken a nest "15 feet up in the branches of a tamarind-tree just outside a village but in the forest."

The breeding season is very extended and possibly, as Jenkins thought, many birds breed twice or even thrice in the year. Wait sent me eggs taken in April and May, Jenkins in May and June, while Phillips also obtained eggs in December and March. Butler found a pair of birds building in June but they deserted without laying.

The eggs of *Dendrophassa* are just smaller replicas of those of *Crocopus*, and the only difference to be recorded is that one only is frequently laid, even Pigeons, apparently, often laying smaller clutches in Ceylon than their nearest relations do in India.

Twenty-two eggs average 28.7×22.6 mm.: maxima 31.1×22.9 and 28.5×23.3 mm.; minima 27.5×21.6 and 28.2×20.7 mm.

In this genus both sexes incubate and both assist in making the nest, though the male does not do much more than collect the twigs. The female is as fanciful as most and often scornfully rejects twigs brought by her husband and then, when his back is turned, picks them up again and uses them.

(1830) *Dendrophassa pompadora phayrei* (Blyth).

THE ASHY-HEADED GREEN PIGEON.

Dendrophassa pompadora phayrei, Fauna B. I., Birds, 2nd ed. vol. v, p. 186.

The Ashy-headed Green Pigeon is the representative of the preceding bird in Eastern Bengal, South to Calcutta, Assam and practically the whole of Burma as far South as Tenasserim, extending into Cochin China in the East.

Like the other species of this genus, this is entirely a forest bird. Its breeding is quite normal, and the description I gave in 'Pigeons and Doves' (p. 29, 1913) covers all that is necessary, while it practically applies to the other races just as well as the present:—"The nest is the usual platform of carelessly interlaced twigs, with no lining and very little depression in the centre, though the projections of the twigs prevent the eggs rolling about. Roughly speaking the nest is anything from 5 to 8 inches across, but they are often far from circular in shape, being much longer one way than the other. In depth they vary from one to three inches, odd pieces hanging about and adding to this. They build their nests in small saplings or in bamboo-clumps as a rule, but now and then one may be taken quite high up in a biggish tree. Both birds take part in the building, but I think the female does most of the actual work of construction, while the male brings the material to her. A pair I watched building their nest in a clump of bamboo quite close to a rest-house I was staying in were accustomed to

work for about two hours only in the morning and again for about the same time in the evening. In spite, however, of the few hours they devoted to work, the nest was completed in three days and the first egg laid on the fourth day. The nests are not generally well concealed and, as they are generally placed at heights more often under rather than over 8 feet, they are easy to find and get at. Occasionally they are placed in cane-brakes in swampy valleys and then, of course, are far more difficult of access though still easy enough to find, the bird sitting so close that one cannot help but notice her as she quits. The site of the nest, too, is often given away by the whistling and antics of the cock bird, which is much given to perambulating up and down a branch close to it while he croons and whistles to his little mate.

"This crooning is a sort of low 'coo-coo,' very like a Dove's but lower and deeper, which I have never heard uttered except by the male to his sitting wife. It is quite a sweet sound, though not so beautiful as the whistling note.

"The breeding season commences in the last few days of March or early April and extends through May and June into July and even August, but April and early May are the months during which most birds lay. In the hills South of the Brahmapootra few birds will be found breeding after May, but in the foot-hills of the Eastern Himalayas a good many continue to nest until well into July, while in Tayoy, on the other hand, Darling took its eggs on the 19th March."

Two hundred eggs average 27.5×21.8 mm. : maxima 30.5×22.2 and 30.1×24.1 mm. ; minima 25.9×22.2 and 27.4×20.3 mm.

I have never been able to ascertain exactly how long incubation takes, but believe it to be thirteen days, and it may be safely said to be twelve to fourteen days.

(1831) *Dendrophassa pompadora affinis* (Jerdon).

THE GREY-FRONTED GREEN PIGEON.

Dendrophassa pompadora affinis, Fauna B. I., Birds, 2nd ed. vol. v, p. 188.

This Green Pigeon is found all along the West coast of Southern India from Kanara to Cape Comorin. Kinloch found it very common in the Nelliampathy Hills. Davidson says its Eastern limit is Birchia in Kanara and, though Jerdon reported them from the Central Provinces, this has never been confirmed. In Travancore it was not common, but Stewart obtained eggs at about 2,000 feet and it probably breeds regularly up to 3,000 feet or higher.

In its habits and nidification this race is quite typical of the species. Bourdillon once found a nest in the Assamboo Hills built at 40 feet from the ground in a large bough of a forest tree, but this is quite exceptional, and all other writers describe the nidification as exactly

like that of *phayrei*. In the Nelliampathy Hills Kinloch found them breeding almost solely in January and February but, elsewhere, they seem to breed principally in late February, March and early April. In Kanara Davidson found most eggs in the middle of March.

Twenty-four eggs average 28.1×22.0 mm. : maxima 29.3×22.0 and 28.4×22.5 mm. ; minima 27.1×21.0 mm.

***Dendrophassa fulvicollis*.**

THE CINNAMON-HEADED GREEN PIGEON.

(1833) ***Dendrophassa fulvicollis fulvicollis* (Wagler).**

THE SUMATRAN CINNAMON-HEADED GREEN PIGEON.

Dendrophassa fulvicollis fulvicollis, Fauna B. I., Birds, 2nd ed. vol. v, p. 189.

Within our limits this little Pigeon is found only in Tenasserim. From this province it extends South through peninsular Siam, the Federated Malay States and the Malay islands to Sumatra.

The nidification of this bird is quite typical of the genus, though little is recorded about it. Butler was apparently the first to obtain the nest and eggs. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 772, 1899) :—"I took a pair of eggs of this handsome Pigeon in Pahang in May. The nest was placed in a low tree in a little sandy island in the Pahang River, on which I landed to try for Jungle-fowl ; the male bird flew out of a tree from close to the nest and I shot him before I noticed it."

In 1906 Partridge jun. sent me several pairs of eggs with the skins of the birds shot off one nest and, finally, Kellow obtained a pair of eggs from a small island off the coast South of Pahang.

All these nests were said to be of the usual character and placed quite low down in bushes and small saplings in forest near streams or in Mangrove-swamps. Nearly all were within reach of the hand.

I have eggs taken in February, May and June (Partridge), and April (Kellow), while Butler took two eggs, as above stated, in May.

Ten eggs average 28.6×21.9 mm. : maxima 30.0×23.4 mm. ; minima 26.9×21.2 and 27.2×20.3 mm.

***Dendrophassa bicincta*.**

THE ORANGE-BREASTED GREEN PIGEON.

(1834) ***Dendrophassa bicincta bicincta* (Jerdon).**

THE INDIAN ORANGE-BREASTED GREEN PIGEON.

Dendrophassa bicincta bicincta, Fauna B. I., Birds, 2nd ed. vol. v, p. 191.

The typical form of *bicincta*, which was named by Jerdon from two birds obtained in "Madras," is found over the greater part

of India where the rainfall exceeds 60 inches and where there is ample humid forest and well-wooded country. Hume says "it is entirely unknown in Khandesh, Goozerat, Kattywar, Sind, the Punjab, Rajputana and the North-West Provinces, and is only known in the sub-Himalayan Terai of Behar and Oudh."

It is very common in Bengal, West of the Bay, and in Assam North of the Brahmapootra, but is replaced by Robinson and Kloss's *prætermissa* South of this river and in Burma and Bengal East of the Bay.

Hodgson recorded it as breeding "in the low valleys at the base of the Nepal Hills" from April to June, and I found it very common in Assam from Gowhaty to Lakhimpur, breeding in the plains and lower hills up to about 2,000 feet in April and May.

The description of the nidification of the Burmese race, *prætermissa*, given further on, applies in every detail to this and to the other races of the species.

I regret that though I have seen so many nests and eggs of this bird I have only the measurements of ten eggs. More often than not the nests Coltart and I found were looked at and left in peace.

The ten eggs average 28.6×23.0 mm. : maxima 30.2×23.9 mm. ; minima 27.7×21.0 mm.

(1835) *Dendrophassa bicincta leggei* (Hartert).

THE CEYLON ORANGE-BREASTED GREEN PIGEON.

Dendrophassa bicincta leggei, Fauna B. I., Birds, 2nd ed. vol. v, p. 192.

So far as is at present determined this small form of Orange-breasted Green Pigeon is confined to Ceylon, but Stewart obtained this species breeding in South Travancore, and almost certainly the birds there are of this race. More skins are required thence to decide this point.

This Pigeon is, like its nearest relations, a bird of the forest and thickly wooded country. Nests and eggs etc. differ in no way from those of the Burmese bird, but the Ceylon form seems to like to build its nest in rather large trees, though not at heights much above 20 feet from the ground. Legge also says that he found a nest lined with roots, but this was surely abnormal.

The breeding season seems to be very long and very irregular, or most likely the birds breed twice or even more often in the year. Wait thinks the real breeding months are April and May, but he took eggs also in August, as did Legge, and in March at Pattalam. Jenkins obtained eggs in January; I bought skins, nest and eggs from Lazarus, a dealer in Slave Island, taken in February, and in this latter month Phillips found a nest with two eggs at Anasigalla.

Twelve eggs average 27.7×21.3 mm. : maxima 28.9×20.4 and 27.8×22.0 mm. ; minima 27.8×20.4 mm.

(1836) *Dendrophassa bicincta prætermis*a Rob. & Kloss.

THE SIAM ORANGE-BREASTED GREEN PIGEON.

*Dendrophassa bicincta prætermis*a, Fauna B. I., Birds, 2nd ed. vol. v, p. 193.

Robinson and Kloss give the range of this subspecies as Assam, South of the Brahmapootra, Manipur, Bengal East of the Bay, all Burma and Siam.

This was one of the most common, perhaps the most common, of all the Green Pigeons in Cachar and Sylhet, both in the plains and in the hills up to 4,000 feet, and I took many and saw many more nests and eggs.

This Pigeon is a forest bird, nine out of ten nests being found in dense evergreen forest, thick secondary growth in deserted cultivation, equally thick scrub, bush and small tree-jungle, or in bamboo-jungle. Occasionally nests may be found in small patches of scrub or in trees in the more open ground round villages. The nest is indistinguishable from that of other Green Pigeons and is generally placed in high bushes, small saplings or in bamboo-clumps, the bird breeding in the last-named rather more often than most Green Pigeons. The favourite height seems to be about 6 to 10 feet from the ground, and I have often seen them low enough down to be looked into without climbing. Very rarely they are built really high up, though I remember watching one bird on the nest at least 30 feet up in a big tree in forest. Sometimes the nests seem to be exceptionally fragile even for a Dove's nest. I took one nest in 1893 which did not consist of more than a score or so of twigs, the interlacing of which was only just close enough to prevent the eggs falling through, and they could be seen quite plainly from below. How they stood the weight of young birds and parent was incomprehensible. The nests are generally placed on clusters of twigs or in interlacing branches but, in Bengal, where they sometimes breed in Mango-groves, the nests are frequently placed on big boughs where a few jutting twigs prevent them from being blown off. They are also rather partial to building their nests in cane-brakes in swamps, resting them on tangles of the cane, 5 to 7 feet or so above the mud and water.

As with all Green Pigeons, the season for breeding is long. Most birds breed from April to June, but I have taken them myself from March to September. In Burma Oates found it breeding in Pegu from March to May and Irwin took a nest with two eggs in Hill Tipperah in April.

Two hundred eggs average 29.5×22.8 mm.: maxima 31.5×23.5 mm.; minima 27.3×21.6 mm.

Both birds incubate and the male takes his full share of the work, and, when not sitting, he often feeds his wife or sits alongside the nest and whistles softly to her. They are very quarrelsome birds,

and I have never seen two nest close to one another, nor will they allow intruders of other species of birds to come too near to their nests. They sit very close, allowing one to almost touch them before they move and, if driven off, return very quickly to the nest.

The male also helps in constructing the nest, though the female does most of the building.

Incubation takes twelve to fourteen days, but I have never satisfactorily fixed the exact time. Display is that common to all the Green Pigeons, such as has already been described.

***Dendrophassa vernans* (Linn.).**

THE PINK-NECKED GREEN PIGEON.

(1837) *Dendrophassa vernans griseicapilla* Schleg.

THE MALAYAN PINK-NECKED GREEN PIGEON.

Dendrophassa vernans griseicapilla, Fauna B. I., Birds, 2nd ed. vol. v, p. 194.

This is one of the most common of the Green Pigeons, over the greater part of its area frequenting much the same country as the other races but also breeding in Mangrove-swamps. In spite of this there is but little on record in regard to its breeding. So far as I know the only person to take its nest in Tenasserim and within the limits of the present work is Hopwood, who took two eggs from a nest built on a tree on the banks of the Little Tenasserim River near Mergui. This was on the 27th November, and the two eggs were quite fresh.

Outside our limits Major H. R. Baker found it breeding commonly in Singapore. He records (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 764, 1907) :—"Breeds from March to May and June; the usual nest and eggs. These birds roost in enormous numbers in the small mangrove-covered islands."

Kellow found them breeding in Mangrove-swamps off the coast of Perak, but only succeeded in finding a few nests of which he sent me two, each containing two eggs. These were taken on the 11th and 21st March and in both cases the eggs were quite fresh.

Sixteen eggs average 27.4×21.6 mm. : maxima 28.8×23.3 mm. ; minima 26.3×21.4 and 27.4×20.3 mm.

Although so common a bird, there is nothing more on record about its breeding habits, which, however, doubtless differ in no way from those of other Green Pigeons.

Treron curvirostra* Raffles.*THE THICK-BILLED GREEN PIGEON.**(1838) ***Treron curvirostra nipalensis* Hodgs.****THE NORTHERN THICK-BILLED GREEN PIGEON.***Treron curvirostra nipalensis*, Fauna B. I., Birds, 2nd ed. vol. v, p. 196.

This little Green Pigeon, so easily distinguished by its scarlet gape and cere, is an inhabitant of the lower hills and adjacent plains of Western Nepal to Eastern Assam and Eastern Bengal; practically the whole of Burma as far South as Tenasserim, East to the Shan States, Yunnan, Annam, Siam and Cochin China.

The farthest West of which I have any breeding notes are in reference to several clutches of eggs taken by Whymper in the Nepal Terai in May 1908. He then found them breeding freely, making their nests "in low trees or in bamboo-clumps."

In Assam we found that the birds kept very closely to forest for breeding purposes, though it did not matter whether this was evergreen, deciduous, secondary growth or even the scrub growing round villages, while on more than one occasion I found them breeding in the orange-groves round my house.

The nest cannot be distinguished from that of the Orange-breasted Green Pigeon, being equally flimsy and placed in quite the same sort of position. Unlike that bird, however, it sometimes breeds in company, and I have several times seen two or three nests within a few yards of one another.

The breeding season is principally late April to early June throughout its Indian and Northern Burmese range, but many eggs may be taken as early as March and others as late as August, while I have also taken them in September and October, these latter being probably second or third broods. In Southern Burma they breed earlier, Bingham, Hopwood and Mackenzie recording eggs taken from the end of January to the end of March.

It is rather interesting to note that Assam eggs seem very small, 100 averaging 27.9×20.8 mm., whereas 200 taken from all parts of the Indian Empire average 28.7×22.6 mm.; maxima 30.0×22.0 and 28.3×23.2 mm.; minima 25.9×20.8 and 26.0×20.0 mm.

Both sexes incubate and both take a share in building operations. These latter I have been able to watch very closely, as a pair built in an Orange-tree in my garden and quite close to my front verandah. When the birds arrived in the grove they wandered from one tree to another and took a long time to decide which Orange-tree in the grove suited them best. All the trees were much alike, about 8 to 10 feet high and, of course, very dense and hushy, and it was only after two or three other trees had been tried and a twig or two placed in position that they made their final choice. -Every morning and evening they worked for an hour or two, one bird often undoing the work done by the other, yet in four days the apology for a nest

was finished and on the morning of the fifth day an egg was laid. Fourteen days after that there were two chicks in the nest, but they may have been hatched the day before, giving a period of incubation of thirteen days. The birds did not mind my moving about in the grove, though from more than one point the sitting bird was quite visible. They sat very close, the male doing most of the work, but between noon and about four o'clock they left the eggs uncovered and wandered about feeding, one bird being always somewhere near the nest.

Sphenocercus apicaudus.

THE PIN-TAILED GREEN PIGEON.

(1840) **Sphenocercus apicaudus apicaudus** (Blyth).

THE HIMALAYAN PIN-TAILED GREEN PIGEON.

Sphenocercus apicaudus apicaudus, Fauna B. I., Birds, 2nd ed. vol. v, p. 190.

This large Green Pigeon is a resident bird from the Murree Hills and Kuman to Eastern Assam in the Himalayas up to at least 8,000 feet, and also in the plains at their feet, whilst it also straggles rather further into and breeds in the plains of Assam and Bengal. In Burma it extends to Tenasserim but, according to Robinson and Kloss, its place is taken in the Malay Peninsula by its near relative *seimundi*.

The breeding habits of the birds of this genus are the same as those of the birds of the preceding ones, *Treron* and *Dendrophassa*, but they are, perhaps, more strictly confined to actual forest and they ascend higher up the mountains. They occasionally place their nests in high hushes or bamboo-clumps and, still less often, high up in big trees. Their favourite site is in among clusters of branches and twigs in small saplings at heights between 15 and 25 feet and, if these are on the banks of a stream or at the edge of some glade, so much the better.

They are, I think, rather late breeders, though the season is very protracted and many birds have two or three broods. Most eggs are laid in April, May and June, but many breed again in July and August, while I have taken fresh eggs in practically every month of the year.

One hundred eggs average 31.7×23.8 mm. : maxima 35.0×24.1 and 34.1×26.1 mm. ; minima 27.6×23.0 and 30.7×22.1 mm.

Both sexes incubate and the male does most of the incubation by day. Nest-building seems to take a little longer than it does with *Dendrophassa*, for though I have seen nests completed in three or four days, most take about a week and some, probably when the female is not ready to lay, take even longer than this.

I believe incubation takes fifteen or sixteen days but have never been able to determine this exactly. It does not take more, however, and may take one or two days less.

Sphenocercus sphenurus.**THE WEDGE-TAILED GREEN PIGEON.**(1841) **Sphenocercus sphenurus sphenurus** (Vigora).**THE HIMALAYAN WEDGE-TAILED GREEN PIGEON.***Sphenocercus sphenurus sphenurus*, Fauna B. I., Birds, 2nd ed. vol. v, p. 200.

The distribution of this Green Pigeon is much the same as that of the preceding bird but it extends farther West and North-West. They occur West of the Ganges, according to Hume, only as Summer visitors, but they have been reported breeding in Kashmir, Murree Hills, Kumaon and the outer ranges of the Himalayas between 4,000 and 9,000 feet as far East as Eastern Assam, where, however, they are quite common, down to 3,000 feet and, occasionally, much lower. They seem to keep more exclusively to evergreen forest than do most Green Pigeons and they very rarely breed in scrub or secondary growth. Another trait peculiar to it is that of placing its nest higher from the ground than do other Green Pigeons. Hume speaks of nests 50 and 60 feet from the ground, and I have myself once or twice seen nests between these heights and more often between 30 and 40 feet. All the same, the great majority of birds prefer to place their nests in saplings and small trees somewhere between 20 and 30 feet and, occasionally, even lower than this. Dodsworth records a nest built on a large bough some 40 feet from the ground, and I have seen others so placed but, more often, they are built on smaller branches or tangles of branches.

The principal breeding months in Assam are April, May and June, but many birds breed in July and August and not a few in March. Here the birds are resident and are equally numerous at all heights all the year round, with the exception that during the Winter they wander further into the plains. In the North-West they are said to be merely breeding visitors for the months of April to August and to breed, or rather to lay, almost exclusively in May and June, and to have only one brood in the year instead of two or more as in Assam and Bengal.

Hume notes: "To the Himalayas West of the Ganges they are merely summer visitants"; Hutton adds: "Within the mountains of the North-West not one remains, neither are they to be found in winter in the warmer region of the Dehra Doon. Leaving us, as it does, as soon as the summer heat decreases, it evidently seeks a warmer climate."

Hume also (in 'Lahore to Yarkand,' p. 119) draws attention to the fact that "vast multitudes of a large and conspicuous species, tenanted during the summer a zone of hills varying from 20 to 100 miles in width and stretching from the borders of Afghanistan to the banks of the Ganges, absolutely desert us during the winter"; and then he goes on to say that he has come to the conclusion that they migrate East to Assam and Bengal. I cannot think this is

the case, for there is no inrush of these Pigeons at any season into these two provinces.

Here we still have one of the mysteries of bird life to work out.

Two hundred eggs average 31.5×23.1 mm.: maxima 35.8×24.4 mm.; minima 28.0×22.0 mm.

Subfamily DUCULINÆ.

IMPERIAL PIGEONS.

Ducula badia.

THE PURPLE-BACKED IMPERIAL PIGEON.

(1842) *Ducula badia badia* (Raffles).

THE MALAYAN PURPLE-BACKED IMPERIAL PIGEON.

Ducula badia badia, Fauna B. I., Birds, 2nd ed. vol. v, p. 202.

The typical race of this grand Pigeon is found from Sumatra, whence it was named, throughout the Malay Peninsula, to the South of Tenasserim and the islands of the Mergui coast.

This is a bird of mountain forests and, though not very much is recorded about it during the summer or breeding months, it probably occurs at this time throughout its range between some 2,000 and 6,000 feet, while Robinson says that it is most often met with at about 4,000 feet.

So far as I know there are only two records of this bird's breeding within our limits. In Hume's 'Nests and Eggs' Davison thus records, under the name of *C. griseicapilla*, its nesting in Tenasserim:—"While ascending the North-West slope of Muleyit on the 27th January I flushed a Pigeon (which I shot) off her nest in a small sapling growing close to the path, but in very heavy virgin forest. The nest was the usual Pigeon type of nest, a mere apology, of a few dried twigs put together. There was only one fresh egg, but the female, on dissection, showed no signs of being about to lay another, so it is probable that one egg only is laid by this species. The egg measures 1.61 in length by 1.15 in width" ($=40.9 \times 30.2$ mm.).

Hopwood obtained one other egg of this bird from a nest built in a sapling in thick evergreen jungle on the slopes of Nwalabo Mountain, Tenasserim, at about 2,000 feet. This egg measures 47.0×34.3 mm., and is probably nearer normal in size than that taken by Davison, which is very small for the size of the bird.

(1843) *Ducula badia insignis* Hodgs.

THE NEPAL MAROON-BACKED IMPERIAL PIGEON.

Ducula badia insignis, Fauna B. I., Birds, 2nd ed. vol. v, p. 203.

This Pigeon occurs from Nepal in the West to Eastern Assam in the Himalayas between the foot-hills and 6,000 feet, but principally

between 2,000 and 4,000 feet, while in Eastern Assam it breeds freely in the plains to some distance from the hills.

In the Khasia Hills, though adjoining the Cachar Hills and South of the Brahmapootra, the form found is much nearer *insignis* than *griseicapilla*, whereas that obtained in the Cachar Hills is nearer the latter bird. This is explained by our geologists, who prove that at one time the Khasia Hills were separated by the Brahmapootra from Cachar. In many instances the fauna is consequently found to be more nearly allied to that of the Northern Himalayan than to that of the Southern hills.

In 'Indian Pigeons and Doves' (p. 101, 1913) I thus wrote of the breeding of this bird:—"The breeding season of this Pigeon on the north-east frontier of India, from Nepal to Sadiya and in the Khasia Hills South of the Brahmapootra, appears to commence when the rains break and to last through July and August, but I have seen its nest, containing a young bird, in March, so it is possible they have two broods, the first from February to March and the second during the rains.

"The nest is of the usual description—a rough platform of sticks with practically no depression in the middle, and measuring anything from 9 inches to a foot in diameter by some two to four inches thick. There is no lining of any description whatever, though some of the smaller, more pliant twigs seem to form the uppermost part of the centre of the nest. The majority of the sticks and twigs of which the nest is composed appear to have been torn living from the tree, but there are also a few pieces of twig and stick which were evidently dead long before the bird made use of them.

"As a rule the nest is placed at no great height from the ground—some twenty to twenty-five feet—in small saplings, but I have seen nests as low down as 12 feet, and one or two at heights over 40 feet. No attempt is made to place the nest in a concealed position, so that with the sitting bird it can usually be seen from some distance. All the nests I have taken have been in the interior of evergreen forest, but often the site selected is one near some natural clearing or opening and, occasionally, is one by some village track.

"The number of eggs laid is never more than one and, though on one occasion I took two eggs from the same nest, it is probable that they were laid by two hens."

There is little I can add to this. Like all Imperial Pigeons both sexes incubate and both build the nest, each fetching materials and incorporating them in the nest.

Twenty-two eggs average 46.2×33.5 mm.; maxima 49.1×36.1 mm.; minima 42.4×30.3 mm.

(1844) *Ducula badia griseicapilla* Walden.

THE GREY-HEADED IMPERIAL PIGEON.

Ducula badia griseicapilla, Fauna B. I., Birds, 2nd ed. vol. v, p. 204.

The ranges of the various races of this Imperial Pigeon were

ill defined prior to being worked out in the 'Fauna.' The present form is that found in the North Cachar Hills, though perhaps not quite typical, Sylhet, Manipur, Bengal East of the Bay of Bengal and all Burma South to Tenasserim and East to Annam. In the 'Fauna' I accepted Muleyit Mountain as an arbitrary limit South, but Robinson thinks the birds of this range should be allocated to the still more Southern race, *badius*, and this I now accept.

In North Cachar I found this fine Pigeon very common and saw many nests and eggs. Hopwood and Mackenzie obtained others in the Chin Hills and Upper Chindwin, while Harington also found it breeding in the Kachin Hills and Shan States.

It frequents the same deep forest affected by the other races, and there is nothing to note about its nest and eggs differing in any respect from those of the Nepal bird.

In North Cachar I found most eggs were laid in June and July but they commenced to breed in March, while I have eggs taken as late as August. In Burma Harington, Hopwood and Mackenzie took all the eggs found by them in March and April.

One egg only is laid, and twelve average 45.1×34.0 mm.: maxima 49.1×33.8 and 45.1×36.2 mm.; minima 43.6×33.1 and 44.4×32.0 mm.

(1845) *Ducula badia cuprea* (Jerdon).

THE SOUTHERN BROWN-BACKED IMPERIAL PIGEON.

Ducula badia cuprea, Fauna B. I., Birds, 2nd ed. vol. v, p. 205.

This Imperial Pigeon ranges from Ceylon, where a specimen was obtained by Inglis, North as far as Kanara, where Davidson says it is common. Its Eastern limit seems to be the range of hills running East of Mysore from Bangalore to the Nilghiris, and it occurs all through the mountainous country of Coorg, the Wynaad and Travancore.

It frequents just the same kind of country as the other races but, in addition, has been found breeding in deciduous forests.

Macpherson took four nests with eggs in March and April in the Wynaad, and remarks: "This bird breeds freely in the forests of Mysore bordering the Wynaad and, as a rule, their nests are not far from rivers and streams."

Bourdillon and Stewart obtained numerous nests in Travancore at all elevations between the foot-hills and the highest ranges, over 5,000 feet. The nests, quite typical for the species, are built nearly always in small trees, tangles of creepers etc. on bigger trees or, though seldom, on branches of bigger trees. They seem always to be low down. Macpherson found all his between 10 and 15 feet from the ground, Bourdillon took one at about 20 feet, and Stewart also found most of his between 15 and 20 feet from the ground and on small trees.

The breeding season is January to May in Travancore, but a fresh egg was taken in Ceylon on October 2nd. Bourdillon says

that in Travancore this Pigeon "has two broods in the year, but only lays one egg at a time. These two seasons are in April and again in November. I have seen a bird building in the latter month and have had the young bird brought to me in January."

Twelve eggs average 44.4×34.6 mm.; maxima 47.1×34.0 and 43.0×35.5 mm.; minima 42.1×31.1 mm.

***Muscadivora ænea*.**

THE GREEN IMPERIAL PIGEON.

(1846) *Muscadivora ænea ænea* (Linn.).

THE MALAYAN GREEN IMPERIAL PIGEON.

Muscadivora ænea ænea, Fauna B. I., Birds, 2nd ed. vol. v, p. 207.

This, the typical form of Green Imperial Pigeon, is distributed over the Islands of Sunda, Lombok, Flores, Sumbar, Pantar and Alar, thence North through the Malay Peninsula to South-West Siam and Tenasserim.

In its general breeding habits this race does not differ from the Indian race, which is much better known, and of which I write more fully on pages 141-2.

Bingham found it common in many parts of Tenasserim, and of the nests he writes:—"On the 10th March, on the road from the village of Podreskai to Meplay, I found a nest of the above Pigeon with the usual single egg, which proved to be hard-set. It was easily seen from below through the flimsy nest of a few sticks and straws laid across and across a horizontally growing bamboo, where a smaller shoot had forked out from it. I shot the female as she flew off and sat on a neighbouring tree.

"On the 17th February, 1877, I found four nests of this Pigeon at Cheoukken, a small village about three miles from the South bank of the Winyeo River in Tenasserim.

"They were all placed in the forks of small trees from 12 to 20 feet above the ground, and were of the usual Pigeon type, mere platforms of twigs without a semblance of lining. Three out of the four contained one young bird and the fourth a pure white cylindrical egg, very slightly set."

J. P. Cook, Hopwood and Mackenzie all found this fine Pigeon breeding freely in various parts of Tenasserim. Their accounts of the nest agree with that of Bingham and, while they add that these nests were all found in evergreen forest, they also say that in many instances the small trees in which they were built stood close to streams or rivers.

Nearly all the eggs of which I have any record were taken in March, but we have Bingham's eggs taken on the 17th February and one other taken by Hopwood as late as the 4th May. It must also,

of course, lay in January, as Bingham found three young in the middle of February.

Eight eggs average 47.6×33.4 mm. : maxima 51.9×34.9 mm. ; minima 44.2×31.9 mm.

(1847) *Muscadivora aenea sylvatica* (Tickell).

THE INDIAN GREEN IMPERIAL PIGEON.

Muscadivora aenea sylvatica, Fauna B. I., Birds, 2nd ed. vol. v, p. 208.

This, the best known of the Green Imperial Pigeons, is a resident breeding bird from Nepal to Eastern Assam throughout the lower hills and Terai and in the plains of Bihar and Bengal. It occurs in Orissa, but there are no records of it breeding there, though it may do so, and it has also been recorded (doubtfully) from Northern Madras. It is found throughout Burma, the Shan States and Northern Siam as far South as Northern Tenasserim. The Northern Tenasserim birds, though they average very white below and on the forehead and face, are generally accepted as being indistinguishable from the present race.

This is essentially a forest bird, breeding in the forests of the plains and also in the hills up to some 5,000 feet, though more commonly under 3,000 feet. It may leave forest for feeding purposes when some of the different *Fici* are in fruit in cultivated and open ground, but I have never heard of their breeding in open country. They like deep forest. The nest is the usual rough platform of sticks and twigs laid either criss-cross loosely or, more often, interlaced so as to leave a shallow depression in the centre. Inglis mentions grass being used in a nest, similar to that found by Bingham in the nest of the Southern form, but this must be quite exceptional. I must have seen at least between forty and fifty nests, but I can remember only one in which some coarse grass was intertwined, though even in this instance it was not used as a lining. The great majority of nests are built upon small saplings at a height of about 25 feet, or under, from the ground but, occasionally, they are built in very large trees and may be 40 feet or so up in the smaller branches. In Burma Hopwood describes them as built low down in small trees in forest, while in the Andamans Osmaston obtained several eggs all taken from nests between 15 and 20 feet up in small trees in ever-green forest.

The breeding season throughout the whole range is principally April and May, but in Assam a few eggs may be taken in June and March ; in Burma it breeds from February to May, while in the Andamans Osmaston took all his eggs in April and Wimberley obtained two eggs in July.

Inglis says that in the plains of Cachar and Sylhet the birds breed in the rains, *i. e.*, from the 15th June onwards, but I have not found this to be the case in my own experience.

It is probable that sometimes they breed twice in the year.

Only one egg is laid but, rarely, they may lay two, as Inglis once took two young from a nest.

Twenty-two eggs average 45.4×33.5 mm : maxima 51.5×33.5 and 45.6×37.6 mm. ; minima 41.1×32.2 and 42.6×31.2 mm.

The nest takes anything from three days to three weeks to build. Both birds work at it but, if the female is not ready to lay, they will play at nest-building for a few minutes only in the mornings and evenings, placing a few twigs in position and then pulling them all out again to start afresh in a new place. Sometimes they will get a dozen small twigs together and then leave them for a couple of days and have to start again when they find that these have all been blown down. Once the female is ready to lay both birds work better for an hour or so morning and evening, and in three or four days the nest is complete and then, usually, the egg is laid the next day.

The male does much of the incubation during the day, and when we have shot a bird off the nest it has generally been the male. I do not know how long incubation lasts. One nest, in which the egg was laid on or about the 1st of May, when I next examined it on the 24th had a chick in it which looked about two or three days old. This would make incubation about twenty to twenty-one days, which is probably about right, as the Rock-Pigeon, a bird of much the same size, takes nineteen or twenty days.

(1848) *Muscadivora zenea pusilla* (Blyth).

THE CEYLON GREEN IMPERIAL PIGEON.

Muscadivora zenea pusilla, Fauna B. I., Birds, 2nd ed. vol. v, p. 209.

This Pigeon ranges from Ceylon, along the South-West coast of India, to about as far North as Kanara. Jerdon's report of its occurrence in the Central Provinces has never been confirmed, while its distribution in Madras is very imperfectly known.

It frequents the same kind of country as the other races, but at the time Hume's 'Nests and Eggs' was written nothing was known of its nidification except that Legge shot a female on the 28th April containing an egg ready for expulsion.

Since then Phillips has taken an egg in December in the North Central Provinces, Stewart and Bourdillon have taken many in Travancore and Bell and Davidson took them from February to May in Khandesh. All these describe the nest as of the usual type and placed on small trees at from 12 to 25 feet from the ground in evergreen forest.

Probably, like so many other Ceylon and Southern Indian birds, their breeding season is either very prolonged or very irregular. The few eggs taken have been in March (Travancore—Stewart and Bourdillon), February to April (Kanara—Davidson and Bell), February to April (Travancore—Bourdillon and Stewart), June (Travancore—Stewart), and December (Ceylon—Phillips). From

Ceylon also we have the April egg obtained by Legge referred to above.

Seven eggs average 43.1×34.1 mm.; maxima 45.2×34.0 and 43.0×34.4 mm.; minima 42.0×33.8 mm.

(1849) *Muscadivora ænea insularis* Blyth.

THE NICOBAR GREEN IMPERIAL PIGEON.

Muscadivora ænea insularis, Fauna B. I., Birds, 2nd ed. vol. v, p. 210.

This Green Pigeon is confined to the Nicobars, and the only information about the nidification is that given in Hume's 'Nests and Eggs.' There he writes:—"They breed in February and March. On the 17th February I found a nest on the Island of Trinkut. It was built in a cocoanut-palm and was about 20 feet from the ground. As usual with Pigeons and Doves, it was simply a platform of dry twigs very loosely put together, and was built on a dried-up fruit branch, which was itself merely a mass of dry twigs. It contained one large white egg." This egg, according to Hume, measures 1.9×1.30 inches ($=48.2 \times 34.8$ mm.).

De Roëpstorff also obtained a fully fledged young one on the 20th February.

Myristicivora bicolor.

THE PIED IMPERIAL PIGEON.

(1850) *Myristicivora bicolor bicolor* (Scop.).

THE PIED IMPERIAL PIGEON.

Myristicivora bicolor bicolor, Fauna B. I., Birds, 2nd ed. vol. v, p. 211.

There is nothing to add to the distribution of this Pigeon given in the 'Fauna':—"Andamans and Nicobars through the Malay Peninsula to New Guinea. It has occurred on the coasts and islands of Burma from Sandoway in Arakan, where it was obtained by Hopwood in 1910. It visits constantly the islands off the Mergui coast and also in scanty numbers the coast itself and is said to breed regularly on all the islands. It also occurs, though irregularly, on the mainland of the West coast of Malay and more numerous on the islands."

Wimberley obtained an egg of this Pigeon on Trinkut Island in the first week of February, but it was much addled and may have been laid long before. Davison failed to find it breeding, but quotes the natives to the effect that it lays in January, February and March.

Osmaston (B. B.) gives a good account of its breeding on South Sentinel Island (Journ. Bomb. Nat. Hist. Soc. vol. xviii. p. 201. 1908):—"South Sentinel is a coral island about a mile long by half

a mile broad, about 17 miles N.-W. of the Little Andaman. The highest point of the island is only about 10 feet above high-tide level, and its centre is occupied by a swamp, the water of which is brackish.

"The whole island, with the exception of the swamp, is covered with dense forest, consisting mainly of Mohwa trees (*Mimusops littoralis*) with an undergrowth of various smaller trees and shrubs. There is a well-defined sea-fence along the shore, consisting of screw-pines (*Pandanus* sp.) and *Hibiscus*.

"In places the mohwa trees are of very large dimensions, but are hollow and evidently long past maturity.

"We found the island swarming with the Pied Imperial Pigeon (*Myristicivora bicolor*), and it was not long before we discovered a nest, containing a single fresh egg, followed by many others. Altogether we found some 50 nests containing each a single egg, some fresh, some more or less incubated.

"The nests were not as a rule close together. They were placed at the tops of small trees or on the lower branches of big ones, usually about 25 feet from the ground. One nest I found was only 10 feet from the ground, but this was exceptional.

"The nest is the usual flimsy platform of sticks, through which the egg is generally visible from below.

"The eggs are, of course, pure white, generally rather elongated ovals with a fair amount of gloss. The measurements are as follows :—

" Longest egg	1.91" × 1.26" (=48.5 × 32.0 mm.).
" Shortest „	1.67" × 1.20" (=42.4 × 30.4 „).
" Mean of 28 eggs.....	1.80" × 1.24" (=45.7 × 30.5 „)."

I make the measurements of thirty-four eggs, including most of those taken as above by Osmaston, to be as follows :—Average 44.2 × 31.2 mm. : maxima 48.3 × 31.5 and 47.3 × 33.2 mm. ; minima 41.3 × 29.6 mm.

Subfamily CALCENADINÆ.

HACKLED PIGEONS.

Calœnas nicobarica.

THE NICOBAR HACKLED PIGEON.

(1851) *Calœnas nicobarica nicobarica* (Linn.).

THE NICOBAR HACKLED PIGEON.

Calœnas nicobarica nicobarica, Fauna B. I., Birds, 2nd ed. vol. v, p. 213.

This Pigeon is found in the Andamans, Nicobars, Cocos and many of the islands of the Malay Archipelago, but it has not yet been met with in any of the islands of the Timor group.

Hume and Davison's combined accounts of the breeding of this Pigeon in Battye Malve leave little more to be said about it. The account (Str. Feath. vol. ii, p. 95, 1874) runs:—"The island appeared to be almost wholly composed of coral, resting uncomfortably on a base of sandstone. It was low, nearly level, bore a certain amount of high tree-jungle and a few patches of cocoanut, and was in most places covered by an excessively dense undergrowth of some thorny bramble-like shrub, here and there interspersed with a few open plots of grass. The moment the level of the island was gained the mystery of the black birds was solved—they were Nicobar Pigeons, and this was *par excellence* the home and stronghold of this magnificent bird. Their nests were as thick upon the trees as ever nests are in a rookery at home.

"Hundreds of birds might easily have been shot.

"Mr. Davison, who zealously climbed numbers of the trees to scrutinize the nests more closely, remarked *Calenas nicobarica* builds a regular Pigeon's nest, and always on trees; on Battye Malve, where we found this bird in thousands, almost every thick bushy tree contained several nests. I counted thirteen on one tree, and I must have examined a couple of dozen of their nests. We visited the islands rather late. Nearly all the occupied nests contained young, and hundreds of young had left the nest. I only succeeded in finding two eggs. The nests were merely a platform of twigs, very loosely and carelessly put together, and without lining of any kind, and in no single case contained more than one young one or one egg, so I think we may safely assert that the normal number of eggs laid by this bird is only one."

In 1907 Osmaston visited Sentinel Island on the 16th February, when he found this Pigeon breeding in small numbers, and then on the 23rd March he went to Battye Malve and found them just as numerous as when Davison visited the island. The birds were in swarms breeding in company on the same tree and he took a long series of eggs laid in nests built at heights varying from 8 feet to 15 feet from the ground, with a few as high as 25 feet. In one tree he found "several nests" and in "many three or four nests."

The eggs are very elegant, a term used by Hume which well describes them, long ellipses often slightly pointed at either end.

Eighteen eggs average 48.0×33.9 mm. : maxima 55.1×33.0 and 50.1×35.2 mm. ; minima 46.3×32.9 mm.

I think they are unusually glossy for Pigeons' eggs. Osmaston says that the fresh eggs of *Calenas* may be distinguished from those of *Myristicivora* "by the colour of the membrane underlying the shell, which imparts a delicate purple tinge to the egg of the former, that of the latter being pure white or faintly yellow."

Subfamily PHABINÆ.

(EMERALD DOVES.)

Chalcophaps indica.

THE EMERALD DOVE.

(1852) *Chalcophaps indica indica* (Linn.).

THE INDIAN EMERALD DOVE.

Chalcophaps indica indica, Fauna B. I., Bird, 2nd ed. vol. v, p. 215.

This beautiful little Dove is found over practically the whole of India and Burma in the wetter, forested areas, but not in the dry zones. It is comparatively common on the South-West coast of India from Bombay to Travancore, and then again all along the outer Himalayas from Kuman and Kashmir to Eastern Assam, occurring South in Bengal, Bihar and Orissa to about the mouths of the Krishna River, though it has actually been also recorded from Masulipatam. In Burma it occurs everywhere except in the central dry zone extending East to the Shan States and South through Tenasserim, the Malay States and the Malay Archipelago to the Philippines.

This Dove is resident wherever found but keeps very closely to forest in the breeding season, though it loves the small glades, sides of jungle-paths or forest streams for this purpose. It occurs from the plains commonly up to 3,000 feet and less often up to 6,000, as I have known it to breed in the Khasia Hills near "The Peak," which is 6,200, in the forest of mixed Oak and Rhododendron growing there. Hutton also obtained its nest above Dehra Doou at about 5,500 feet.

The nest is the usual Dove's nest of small twigs and sticks, but is better put together than are most nests of this family, and the depression in the centre is generally well defined and sometimes as much as an inch in depth. The twigs of which the nest is composed are both such as are picked up dry and small living twigs which the bird is able to tear from bushes and trees, often with some leaves still attached to them. Most nests are placed on high bushes or small leafy saplings, from 5 to 10 feet from the ground, but occasionally a nest is built quite low down in a dense clump of bamboo while, in the Nicobars, Davison found them nesting on the fronds of young coconut-palms about 6 feet from the ground. Darling also, writing of Vythery, says: "I have noticed a great many old nests on the

fronds of the wild cocoanut-palm, which never grows more than 12 or 16 feet high."

The Emerald Dove is more particular that its nest is well concealed than are most Pigeons and Doves which build in similar places, and I have frequently taken nests so well hidden in thick bushes, brambles or cane-brakes that they were only found with difficulty.

The nests measure roughly about 5 to 7 inches in diameter and about 2 inches in depth, but a few nests are just platforms about an inch thick and without any cup for the eggs.

The breeding season lasts more or less throughout the year, but in the hills most birds lay from April to July. In the plains they seem to have two seasons, both more or less well defined. Bourdillon says that in Travancore they breed in April and May and again in November and December, while in the Nellaiampathy Hills Kinloch found the same to be the case. In the Nicobars Davison found eggs in February and March, but Osmaston, both in the Andamans and Nicobars, found them from March up to July.

The eggs number two in a clutch, while in the Andamans and Nicobars a single egg is sometimes laid, as such have been found hard-set.

Hutton and Bourdillon both describe the eggs as white, like those of the common Doves, but Bourdillon has given me eggs which are, like all those I have taken myself, a pale creamy buff or pale *café-au-lait*. White eggs may and do occur but they are abnormal and are laid by birds in which the pigment is wanting, just as happens sometimes in the eggs of practically every species.

In shape they are the normal ellipses, rarely rather pointed at both ends. The texture is fine, hard and close, and the surface often glossy.

Two hundred eggs average 27.0×21.0 mm.: maxima 28.8×22.3 mm.; minima 22.5×19.6 mm.

In the way they carry out their matrimonial duties they differ in no way from other Doves, both sexes sharing alike in everything. The young are fed with regurgitated food like the young of other Pigeons, and the parents are as pugnacious and overbearing to other birds as are the rest of the Pigeon tribe.

I think incubation takes twelve days. Eggs, the first of which was laid on the 3rd April, were hatched on the 17th of that month. Eggs may be laid on consecutive days or with an interval of one day between. Many pairs must have two or even three broods in the year.

Although rather familiar little birds in some ways, they desert very easily, and will never return to a nest which has been handled.

(1853) *Chalcophaps indica robinsoni* Stuart Baker.

THE CEYLON EMERALD DOVE.

Chalcophaps indica robinsoni, Fauna B. I., Birds, 2nd ed. vol. v, p. 217.

This race is confined to Ceylon, the South Travancore bird being the same as the Indian one, so far as we can tell with the material now available.

In its haunts and in its breeding habits it differs in no way from its Indian cousin, and Wait says ('Birds of Ceylon,' p. 305) it is "found almost all over the Island, wherever there are forests."

There seems to be no particular breeding season. Wait writes that nests may be looked for any time between February and July, but Phillips has taken eggs from early February to the end of September, while Tunnard took hard-set eggs in January and slightly set eggs in October. The normal clutch is two, as in most other Pigeons and Doves, but occasionally one egg only is incubated; they are quite indistinguishable from those of the Northern bird.

Twenty-four eggs average 25.9×20.8 mm. : maxima 28.1×19.6 and 26.0×21.1 mm. ; minima 25.0×20.9 and 26.6×19.1 mm.

Subfamily COLUMBINÆ.

(PIGEONS and DOVES.)

Columba livia Gmelin.

THE BLUE ROCK-PIGEON.

(1855) *Columba livia neglecta* Hume.

THE LADAK BLUE ROCK-PIGEON.

Columba livia neglecta, Fauna B. I., Birds, 2nd ed. vol. v, p. 220.

This race of the European Blue Rock-Pigeon is resident in India all over the North-West from Sind to Kashmir and Ladak, the North-West Provinces, British Baluchistan and the greater part of the Punjab. Thence they occur all over Afghanistan, Baluchistan, Turkestan and East and South Persia.

All the races of Indian Rock-Pigeons are much the same in their breeding habits etc., and these are fully dealt with under our most common Eastern form, *intermedia*, and need not be considered separately for each race. As regards the present bird we may quote Ticehurst's remarks (*Ibis*, 1923, p. 463), which give a good idea of the bird and in many respects are also applicable to the other races:—"It is very difficult if not impossible to say what Rock-Pigeons in Sind are really wild birds; every town and village of any size contains great numbers, and these stray away into the surrounding country and come to lead a feral existence, and one

may find Pigeons well away in the desert or cultivation inhabiting railway bridges or wells. However, in the Sind hills, far removed from any habitation, it is common in places, and is there I believe truly wild. In cliffs, in some of the hills bordering the Gaj, Barun and Habb rivers, it is numerous, inhabiting caves, wider crevices and ledges. As elsewhere, the Pigeon breeds more or less all the year round."

Personally I think I should reverse Ticehurst's reasoning, and consider that the true feral birds have become more or less semi-domesticated in their habits. Pigeons are birds which, though they only lay two eggs at a time, increase at an extraordinary rate under normal circumstances and, probably, very much faster still once they accept the homes and ruins of homes of mankind as breeding centres.

As regards its breeding habits, we need quote here only one or two notes dealing with curious exceptions. First and most unusual is Pitman's account of two nests found by him in the Deragut District on the North-West Frontier. These two nests were built on wild fig-trees, "massive constructions of sticks and twigs lined with finer material and dead grass. One was placed among the thin top branches about 18 feet from the ground; the other was placed on a stout branch about 12 feet from the ground." In many places they have been found breeding in the walls of wells, often at considerable depths, but around Quetta the birds go one better, and Marshall found them breeding freely in the underground water-channels.

For the rest they breed in buildings of all kinds, cliffs, river banks etc., in colonies large and small, and their nests and eggs are indistinguishable from those of the common Indian bird.

Forty-eight eggs average 38.5×28.7 mm.: maxima 42.5×28.0 and 40.0×29.6 mm.; minima 36.6×27.8 and 36.1×27.5 mm.

(1856) *Columba livia intermedia* Strick.

THE INDIAN BLUE ROCK-PIGEON.

Columba livia intermedia, Fauna B. I., Birds, 2nd ed. vol. v, p. 221.

This dark form of Blue Rock is found in Ceylon and over the whole of India with the exception of the area occupied by the preceding bird, and again in Assam East of Goalpara. In the Surma Valley it occurs here and there, though it is not widely spread, but becomes again more common in the Bengal districts East of the Bay. In Burma it is common in the more dry central districts, but appears to be rare North and South of this, though Macdonald reports it as common in the Myingyan District. In the South and Eastern Punjab I should place all the birds as *livia* but, of course, here they are somewhat intermediate, and as one approaches North and East Punjab the birds more and more closely approximate to the paler race, *neglecta*.

When I wrote my 'Pigeons and Doves' I did not separate *neglecta* from typical *livia* but, with that exception, what I then wrote about their breeding covers the ground very completely. I wrote (p. 137).:—"The natural sites for this bird's nests are undoubtedly holes and caves in steep cliffs, or in the sides of rocky ravines but, as the bird has gradually spread across the continent, and has left places where such sites are obtainable, it has adapted itself without difficulty to the requirements of civilization, and now breeds regularly in masonry wells, old temples, ruined buildings of all kinds, and even in occupied brick and stone buildings. One curious place I found some birds breeding in was a collection of deep hollow-pits, beside the main road leading into the town of Krishnagar, and this was the more strange in that there was an abundance of masonry buildings of all kinds, old and new, within a very few hundred yards of where the birds were nesting.

"They breed in colonies, often very large ones, and I know of no instances of single nests being found. The nest itself is the usual untidy platform of dry twigs, but much mixed with a good deal of rubbish, such as straw from cattle-bedding, grass and the accumulation of moulted feathers from countless generations of birds. They make use of the same nest for several broods and, I think, almost certainly, for many consecutive years, so that, as might be expected, they get into a filthy state and are full of vermin.

"In 1883 when I was stationed in Nadia some two hundred pairs of these Pigeons bred in the roof of a very old police-station in that district. This roof consisted of an upper stone-slab one, and a lower false one of bricks, with a gap between the two of some four feet, in which the birds built their nests, finding entry by the holes left for ventilation. As this was a part of India where the birds were not held to be sacred, I forced an entry into the roof and inspected the nests, the owners of which had left in a panic-stricken crowd prior to the commencement of my house-breaking operations. There must have been fifty or sixty nests in the division of the roof visited, some in groups of five or six all huddled together, others a few feet apart from any other but, all alike, were in a filthy condition and the material looked as if it must have been collected there by many generations previously, each generation adding its quota of feathers and insects and a little dirty straw collected from a cattle byre a few yards away.

"In spite of the close proximity of the nests to one another, in none did I find more than two eggs or squabs, nor have I personally ever seen more, but Ferguson, Inglis and others have taken three eggs from nests, so it may be that this Pigeon does occasionally lay three eggs or, and this is more likely, two birds may lay in the same nest."

The breeding season of the Blue Rock-Pigeon may be said to commence on the 1st January and to end on the 31st December, but in certain areas certain months are especially favoured while,

in the hills, in which the birds breed up to a height of some 4,000–6,000 feet, most birds lay between May and July. In Bengal I have taken or seen eggs every month in the year; in Bihar Inglis has taken them every month except February. In the Doab Marshall says they breed mostly in April, May and June, and in Ceylon they are said to lay in May and June.

The colonies are often of very great size. Hume writes:—"At the grand old fort of Doig in Bhurtpoor, several *hundred thousand* pairs of birds must live and breed. A gun fired in the moat towards evening raises a dense cloud, obscuring utterly the waning day and deafening one with the mighty rushing sound of countless pinions."

Jerdon also says that "The celebrated falls of Gairsoppa are tenanted by thousands of Blue Pigeons, which here associate with the large Alpine Swift."

One hundred eggs average 36.9×27.8 mm. : maxima 41.4×27.6 and 37.3×32.7 mm. ; minima 35.0×26.0 mm.

Both sexes share equally in constructing the nest, incubating the eggs and feeding the young, the last process being carried out in the same way that domestic and, indeed, all other Pigeons feed their young, the parents semi-digesting the food and regurgitating it into the mouths of the squabs. The latter thrust the entire head into the mouths and throats of their parents when feeding, the bill and face disappearing from view.

Incubation takes about sixteen days.

Columba rupestris Pallas.

THE HILL-PIGEON.

(1857) *Columba rupestris turkestanica* Buturlin.

THE TURKESTAN HILL-PIGEON.

Columba rupestris turkestanica, Fauna B. I., Birds, 2nd ed. vol. v, p. 222.

This Hill-Pigeon breeds within our limits in the Himalayas from Gilgit and Kashmir to Sikkim, and there are specimens in the British Museum labelled "Darjiling" but which may have been obtained from farther North. It is extremely common in Tibet, while it is also found in Turkestan and the Altai between 8,000 and 14,000 feet during the breeding season.

In Tibet this Pigeon breeds both in large and small colonies in holes, caves and crevices in cliffs and in the houses, deserted and occupied, of the Tibetans. If built in the cliffs they seem always to be in the most inaccessible places, and all my correspondents, from Steen onwards, have not been able to get at them; but vast numbers also breed in the houses. In the latter they place their nests under the roofs, on the rafters, in any odd hole in the wall etc., and often several pairs breed in the same building. The nests are just like those of the Rock-Pigeons and, apparently, equally verminous. Ludlow, in his "Birds of Gyantse" (Ibis, 1928, p. 215),

refers only very briefly to the breeding of this bird :—" They breed everywhere between Phari and Gyantse in June, constructing their scanty nests in holes in banks, precipices, and in inhabited and uninhabited dwellings."

Marshall found these Hill-Pigeons breeding in the Panji Valley, on the Chenab, while Ward records it as very common in some of the higher elevations in Kashmir.

I have received eggs from Yatung taken on the 6th April from two nests in inhabited and, therefore, warm houses, but this is probably unusually early. Other eggs have been taken by Steen, Kennedy, Macgregor and others from early May to the end of July, and it is possible some birds have two broods in the year.

Fifty eggs average 37.0×27.5 mm. : maxima 39.0×26.5 and 38.5×29.3 mm. ; minima 35.9×28.0 and 36.8×26.2 mm.

Columba leuconota.

THE SNOW-PIGEON.

(1858) *Columba leuconota leuconota* Vigors.

THE NEPALESE SNOW-PIGEON.

Columba leuconota leuconota, Fauna B. I., Birds, 2nd ed. vol. v, p. 224.

This beautiful Pigeon is found throughout the Himalayas, from 10,000 feet upwards, from, and including, Afghanistan to Western Ladak, Garhwal and Sikkim. Rattray also found it breeding in small colonies at 9,000 to 9,500 feet near Sonamurg and, in Garhwal also, Whymper found a large colony breeding at 9,000 feet.

This Pigeon is entirely one of open bare mountains, with steep cliffs and precipices, never frequenting forest or heavily wooded country. They seem to breed only in caves, rifts and crevices in rocky cliffs and precipitous sides of rivers and never, like the Rock- and Hill-Pigeons, in human habitations. As a rule the colonies are in such inaccessible positions that the eggs are quite out of reach or can only be got at with such preparations as are not possible when the colonies are discovered.

Whymper found a huge colony of these Pigeons breeding near Gangotri at about 9,000 feet, but they were utterly unapproachable. These were building their nests in caves and crevices, but a little higher, at about 10,000 feet, he came on a much smaller colony nesting on steep rocks above the Gaugotri. Although this was on the 25th of May most of the nests already contained young, but he succeeded in getting a few eggs, of which he sent me a pair. Rattray also found most of the Kashmir colonies quite impossible to raid, but he came on two or three small colonies of from eight to ten pairs which he managed to climb up to and, on the 10th June, he found one of which the nests contained eggs, and obtained two from one nest and three from another.

The nests seem to be much the same as those of the Rock- and Hill-Pigeons, though all my correspondents speak of them as less bulky yet equally dirty and full of vermin. They are made of twigs with all sorts of oddments added, and are apparently used year after year without much in the way of additions or repairs, so that they never attain the weight and measurements acquired by some old nests of the Blue Rock-Pigeon. Rattray calls them "scanty nests made of a few dry twigs" but, occasionally, they are "massive with congealed excrement and much matted straw and feathers."

The breeding season seems to be principally May and June, but as Whympers found young on the 20th May some eggs must be laid in April, and I have one record of eggs laid in July. There is no evidence of whether they have more than one brood in the year, but it seems probable that very few birds, if any, breed more than once.

The average of forty eggs is 40.3×29.1 mm. : maxima 42.8×29.3 and 40.8×31.2 mm. ; minima 34.6×26.3 mm.

It is possible that a larger series would give a still higher average, as in the series measured by me there are included two exceptionally small pairs and the three very small eggs taken by Rattray from one nest.

Columba palumbus Linn.

THE RING-DOVE.

(1861) **Columba palumbus casiotis** (Bonaparte).

THE EASTERN WOOD-PIGEON or RING-DOVE.

Columba palumbus casiotis, Fauna B. I., Birds, 2nd ed. vol. v, p. 227.

Within our limits this Pigeon probably breeds in the Himalayas from the Afghanistan border to Sikkim at very high elevations, except along the North-West Frontier, where they breed as low down as 2,500 feet. Outside our limits it breeds in Afghanistan, Baluchistan and South Persia.

This Pigeon has been found breeding by Unwin in the Agrore Valley at 2,500 feet, where he obtained a nest with two nearly fresh eggs on the 20th May; Marshall (C. N. T.) and Cock found it breeding round Murree in June; Wardlaw Ramsay and Barnes obtained a number of nests, the latter with eggs, in the Harial District, Afghanistan, in June; and Major O. K. Tankard took some nests with one or two eggs in them in the Jhelum Valley in Kashmir.

Apparently these Pigeons breed at 2,500 feet upwards in some of the ranges of the Himalayas within our limits, but are very capricious in their choice of breeding grounds. Thus Hume says that about Simla, Mussoorie and Almorah, although comparatively common from November to the middle of April, they never stay to breed. Hutton, Wilson, Ward and others all confirm this, and the curious

local migrations are probably governed by food-supply. Whitehead (Ibis, 1909, p. 266) says that "it is a resident species in the Kurram Valley and Mr. Donald tells me that it nests freely on the Zera Kotal, above Shinauri and North of the Samana."

Waite found a nest of the Eastern Wood-Pigeon on the 12th April in the Jhelum portion of the Salt Range at an elevation of about 2,000 feet. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 595, 1923):—"The locality was the thickly wooded bottom of a narrow valley (part of a Government Forest Reserve) through which a small stream of fresh water flows down to the plains below. The nest was on a branch of a Ber-tree, roughly 20 feet from the ground, and contained two half-fledged young. The parent bird was on it and sat very close, taking no notice of clods of earth thrown into the branches near by and only flying off when a man started to climb the tree."

To this the Editor adds a note that this bird breeds "not uncommonly in the Salt Range about Sarkesur, and eggs have been taken there as late as August 1st."

The birds retire to forests to breed and make their nests, typical Wood-Pigeons', in Fir and other trees, but at no great height from the ground.

Cock, writing of Murree, notes that they "nest on bushes and small trees, never, according to our experience, at any great height from the ground; I should say that 12 feet was the usual height."

The breeding season is late; in the higher levels a few birds may breed in May but the great majority lay in June and early July, so that it is unlikely that they have more than one brood in the year.

At the lower elevations the season is earlier and much more prolonged for, as noted above, half-fledged young have been found on the 12th April and eggs on 1st August, so that it would seem that here they almost certainly breed twice.

As regards the eggs, the only point to note is their comparatively small size, a character alluded to by Hume, Marshall, Barnes and others.

I have now obtained measurements of eighteen authentic eggs, and the average is only 39.9×29.4 mm.: maxima 42.0×28.8 and 40.6×30.4 mm.; minima 37.2×28.2 and 37.3×27.3 mm.

Witherby gives the average of one hundred British eggs as 41.1×29.8 mm.

(1862) *Columba elphinstonii* (Sykes).

THE NILGIRI WOOD-PIGEON.

Columba elphinstonii, Fauna B. I., Birds, 2nd ed. vol. v, p. 228.

This Pigeon is confined to the hill-tracts on the South-West of India from Kanara to Cape Comorin. Col. Sykes also obtained it in the Deccan, but Capt. Blaxland's report of its occurrence on the Mahanadi and Godavery Rivers has not yet been confirmed.

It is a bird of high elevation forests, breeding both in the "sholas" (thickly wooded valleys) and in the more extensive upland woods on the Nilgiris and other hill ranges. On the Nilgiris Miss Cockburn, Davison, Cardew, Rhodes Morgan and others have taken nests with eggs and young at elevations of 5,000 feet upwards, and Packard took them up to 7,000 feet, while Howard Campbell obtained two eggs from two nests at about 4,000 feet.

In the Palnis Macgregor and Capt. Horace Terry found them breeding still lower, and Stewart informs me that they breed in the Travancore ranges from 4,000 feet also but that he has only once taken an egg.

Davison records: "This Wood-Pigeon breeds on the Nilgiris and its slopes, breeding rather late in the year. The nest, which is merely a platform of dried twigs, is usually placed in some thick thorny bush or mass of cane from about 12 to 20 feet from the ground. I believe that this Pigeon, like the other Fruit-Pigeons, only lays one egg." This building in comparatively low positions is confirmed by others. Howard Campbell found them breeding on high bushes in sholas; Rhodes Morgan remarks that they nest 8 or 10 feet from the ground, while Packard took an egg from a bush 15 feet up. Miss Cockburn, however, says that they breed "on high trees in dense woods."

Most eggs are laid in May and June, but the season lasts from March to July, so some birds may lay twice.

A single egg is laid and I have no record of more than this.

Nine eggs average 38.4×28.8 mm.; maxima 38.8×29.0 and 37.6×30.0 mm.; minima 36.0×29.0 and 37.9×26.6 mm.

(1863) *Columba torringtonii* Bonap.

THE CEYLON WOOD-PIGEON.

Columba torringtonii, Fauna B. I., Birds, 2nd ed. vol. v, p. 229.

This Wood-Pigeon is confined to Ceylon, where Legge says it is "Essentially a bird of the mountain forests. It is very abundant on the Newara Eliya plateau forests and on all the surrounding wooded slopes down to an elevation of about 3,000 feet; below this it is not numerous. I met with it in Newara Eliya in May and found it plentiful on the Horton Plains in January; it seemed then to prefer the peculiar isolated groves on the plains to the surrounding forests, no doubt owing to a greater abundance of food obtaining at that time in the former. It is very numerous in the Peak forests, where I procured it under 3,000 feet. In the Morowak Korale I have killed it as low as about 2,400 feet."

There is very little on record about its breeding. Kelaart says that "it comes to Newara Eliya to breed, and I have seen a nest with only one egg as large as that of the domestic Pigeon." Blyth told Legge that "I have seen their nests both in Spring and Autumn

as late as October; they generally build in lofty forest trees, but I once frightened a large young one from a nest on a small tree some 15 feet above the ground." Butler also records: "I have one egg, taken by my brother, Mr. C. E. Butler, in Uda Pusselawa, on November 11th, 1894. He described the nest as placed in a small tree in jungle about 25 feet from the ground."

Jenkins took two eggs, one each from two nests found on the 24th February; the nests were said to be "massive Pigeon's nests of sticks placed high up in very tall trees in dense evergreen forest in a ridge running down from Adam's Peak at an elevation of about 4,000 feet."

These two eggs measure 39.0×29.9 and 39.0×29.0 mm.

(1864) *Columba pulchricollis* Hodgs.

THE ASHY WOOD-PIGEON.

Columba pulchricollis, Fauna B. I., Birds, 2nd ed. vol. v, p. 230.

This fine Pigeon is found from Nepal through Sikkim, Bhutan and Tibet between 7,000 and 10,000 feet; in Assam between 5,000 feet and the highest peaks, the Shan States and Formosa. Robinson says that it is also found on the coast and islands of the Malay Peninsula but, presumably, only in Winter.

Personally I have always found this to be a very shy retiring bird during the breeding season, keeping to very thick woods where, as it is a very silent bird, it escapes notice, and it may be really less rare than one imagines it to be. I took two nests of this bird at Hangnum in 1896 at an elevation of about 5,000 feet; they were both of the ordinary Wood-Pigeon type, mere rough platforms of small twigs, coarsely but strongly interlaced, but they had one very distinctive and unexpected feature, namely, a sparse lining of feathers, which may have been quite abnormal. The nests were rather large, nearly 9 inches in diameter; there was little or no depression for the eggs, these laying among the feathers and prevented from rolling by the irregularities in the interlacing of the twigs.

The nests were in rather unique positions. Both were in stunted Oaks (*Quercus serratifolia*), one resting on a great mass of flowering orchids (*Dendrobium chrysotoxum* and *D. dalhousianum*) and the other on a mass of pendent green moss and Hart's-tongue fern.

They had selected very beautiful surroundings, each tree growing among a wealth of bracken, caladiums, jasmines, begonias and maiden-hair fern, while the trees themselves were clothed in long streamers of vivid green moss, mixed everywhere with a variety of orchids.

These two eggs measured 37.0×27.0 and 41.2×29.8 mm.

In later years two other similar nests were found by me, and these again had feathers in the base. I have called them linings, but perhaps a more correct description would be to say that fairly large

feathers had been used, in addition to twigs, in the upper part of the nest. The feathers were those of the Pigeons and a few of Barbets and other birds.

Masson obtained one egg from a nest in Oak-forest near Darjiling at about 8,000 feet. He says nothing about feathers in this nest; nor does Osmaston refer to them in his description of the nests which he took at Darjiling, and of which he merely writes: "they were of the ordinary platforms of sticks and contained each one bird" (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 515, 1904); they were built 6 and 10 feet respectively from the ground in small trees.

Eggs have been taken in June and August, and young, well advanced, in the former month, so that May to August evidently forms the breeding season.

Five eggs average 37.6×27.4 mm.; maxima 42.3×30 mm.; minima 37.0×27.0 mm. A larger series is sure to give a much bigger average.

(1865) *Alsocomus puniceus* (Tickell).

THE PURPLE WOOD-PIGEON.

Alsocomus puniceus, Fauna B. I., Birds, 2nd ed. vol. v, p. 232.

This very handsome Pigeon has been recorded on the extreme West of its range in the Chambi Valley by Ludlow. It is not uncommon in Eastern Bengal in all districts West to Singhbhum and Manbhum and East through the Assam Valley into Burma. It is found in all the wetter districts of Burma, Cochin China, Siam and the Malay Peninsula.

For breeding purposes the Purple Wood-Pigeon keeps entirely to forest, but this is not always evergreen, and I have taken the nest in scrub-jungle, secondary growth and in bamboo-jungle. It is normally a bird of low elevations but occurs up to 3,000 feet, while I have taken the nest up to 3,500 feet in the Khasia Hills. The nest is a quite typical one, the usual platform of small twigs, rather small for the size of the bird, measuring 8 or 9 inches in diameter by about $1\frac{1}{2}$ to 3 deep. They are placed low down; I have never seen one over 20 feet from the ground and most are between 5 and 10 feet, built in tall hushes, small trees and saplings or in bamboo-clumps. No attempt is made at concealment, but the nests are never very conspicuous.

Oates, who was the first to find the nest and eggs of this bird, writing to Hume from Pegu, says:—"Kyekpadein, 27th July.—Nest in fork of horizontal bamboo-bough, about 10 feet from the ground, composed of a few twigs woven carelessly together. Male bird sitting. Egg quite fresh. Size 1.47 by 1.15 in."

It is a late breeder, eggs being laid from the middle of May to the end of July or, occasionally, in August.

Only one egg is laid and, though I once took two from a nest, one was addled and long laid while the other was fresh. Another time when I found two both were fresh, so it may be that every now and then two are laid.

Fifteen eggs average 37.6×29.2 mm. : maxima 41.5×32.5 mm. ; minima 35.5×28.0 and 39.1×26.6 mm.

I think both birds help in nest-building, as I have seen a male carrying twigs, and he certainly does the greater part of the incubation, at all events by day, as we shot or caught males on the nest more often than females.

(1867) *Dendrotreron hodgsonii* (Vigors).

THE SPECKLED WOOD-PIGEON.

Dendrotreron hodgsonii, Fauna B. I., Birds, 2nd ed. vol. v, p. 234.

The Speckled Wood-Pigeon is found throughout the Himalayas from Kashmir to Eastern Assam and thence through the hills of Northern Burma to the Shan States.

It is a bird of high-level dense forests, and Elwes found it at 13,000 feet in Sikkim ; generally speaking it breeds between 8,000 and 11,000 feet, while in Assam it occurs in Summer as low as 6,000. Cock told Hume that it "breeds in Kashmir. In June I shot the birds, which were evidently breeding, in the Sonamarg Valley. I was not, however, fortunate enough to take their eggs."

Ward also reports it as breeding at about 8,000 feet near Sonamarg, but there were no eggs of this bird in his collection when I acquired it.

The only two nests taken by myself were both found in a lofty hill-range, running to 6,000 feet, an offshoot of the Barail Range in North Cachar. Both nests were of the usual type of Wood-Pigeon's nest, a rough platform of twigs, green and dry, interwoven with one another, with but little depression for the eggs and no lining of any kind. Both were placed in small stunted Oaks and were built on horizontal boughs some 15 to 20 feet from the ground. In one case the nest half-rested on a clump of the sweet-scented white Orchid (*Celogyne odorissima*) and in the other case half on the bough and half on a cluster of twigs.

Towards the end of May and June W. P. Masson took six eggs on the Sikkim-Nepal frontier or a few miles inside Western Nepal. These nests were all taken at an elevation between 8,000 and 10,000 feet and all were built on boughs of small trees growing in stunted forest at heights between 8 and 25 feet from the ground. Each nest contained a single egg, similar to but a trifle smaller than the two taken by myself in Hangrum.

Eight eggs average 39.3×30.1 mm. : maxima 41.5×29.4 mm. ; minima 33.9×25.9 mm. The average excludes this egg, and the next smallest is 35.3×27.9 mm.

Streptopelia turtur (Linn.).**THE TURTLE-DOVE.****(1869) Streptopelia turtur arenicola (Hartert).****THE PERSIAN TURTLE-DOVE.***Streptopelia turtur arenicola*, Fauna B. I., Birds, 2nd ed. vol. v, p. 237.

The Persian Turtle-Dove breeds in Southern Persia, Arabia, Palestine, Mesopotamia, Afghanistan, Baluchistan, Yarkand, Gilgit and the North-West Frontier of India.

The only instance of this Dove breeding actually within our limits that has come to my knowledge is one with two eggs found by Whitehead beyond Dera Ismail Khan on the 7th April, 1903 : "Nest on thorny acacia about 8 feet from the ground."

These two eggs measure 29.4×22.4 and 30.0×23.0 mm.

I have a fair series of this Dove's eggs from round about Bagdad taken by Sir Percy Cox and Major Cheesman, and others taken by Cumming at Fao. The average of twenty-eight of these eggs is 29.9×23.4 mm. : maxima 31.4×22.3 and 30.3×23.0 mm. ; minima 29.0×21.2 mm.

One would have expected to find *arenicola* breeding at Quetta, but neither Williams, Betham nor Meinertzhagen report seeing it there.

Streptopella orientalis.**THE RUFOUS TURTLE-DOVE.****(1870) Streptopella orientalis orientalis (Lath.).****THE RUFOUS TURTLE-DOVE.***Streptopella orientalis orientalis*, Fauna B. I., Birds, 2nd ed. vol. v, p. 238.

Within our limits this Turtle-Dove is found in Sikkim and Nepal, thence through Tibet and the Chinese mountains into North Manchuria, Corea and Japan.

I have never taken a nest of this bird myself, but have had eggs taken for me in Nepal, Sikkim and Tibet, and others again from Manchuria and Japan. According to my own collectors it builds a nest just like that of other Turtle-Doves, a flimsy flat construction of twigs, very carelessly and very untidily put together, and measuring anything between 6 and 8 inches in diameter. Kennedy, in sending me eggs from Tibet, terms the nests "very ramshackle affairs, one built on a willow and one on a high thorny hush in thin scrub-jungle." In Native Sikkim and Nepal the site selected may be in some high thick bush, small sapling or tangle of briars, and I have no account of any nest taken at more than 10 or 12 feet from

the ground. In Sikkim and in Tibet the nests were often taken in quite open country, sometimes in isolated bushes and trees, but my informants in Nepal tell me that they *generally* found the nest in well-wooded ravines and sometimes well inside extensive forest. All the nests, so far as I am aware, were taken at elevations over 8,000 and those in Tibet over 12,000 feet.

Ludlow, in his "Birds of Gyantse" (Ibis, 1928, p. 215) writes :— "This bird abounds in Gyantse in summer wherever there are trees or bushes. It begins to arrive during the first week in April, and departs during the latter half of October. It breeds during May and June in bushes, making the usual flimsy nest of twigs. Eleven eggs average 33.5×24.5 mm."

Twenty-six eggs which I have measured average 34.2×24.5 mm. : maxima 35.1×25.1 and 34.3×26.0 mm. ; minima 32.4×24.4 and 34.8×24.1 mm.

Osmaston found some race of *orientalis* breeding in Ladak— at Basgu, 10,800 feet; Saspul, 10,250 feet; and Kargil, 8,900 feet. It is interesting to note that of three nests he found on the 29th July one was just being completed, one contained half-fledged young, and from the other the young had just flown. This would infer that eggs may be found from early May to the end of July, as, indeed, they are in Tibet at even higher elevations.

(1871) *Streptopella orientalis ferrago* (Eversmaun).

THE NORTHERN INDIAN RUFOUS TURTLE-DOVE.

Streptopella orientalis ferrago, Fauna B. I., Birds, 2nd ed. vol. v, p. 239.

This race is common in India from the borders of Afghanistan to Sikkim in the Himalayas up to about 8,000 feet. Outside our limits it breeds in Western Central Asia, Turkestan and Afghanistan and Eastwards, where also its elevations and habitat are apparently 8,000 feet or lower. In Kashmir Ward has found it breeding up to 8,500 feet, Whymper and Osmaston have taken nests up to 9,500 in Garhwal and the former also at Naini Tal at about 6,000 feet. In Sikkim Stevens saw and obtained birds in early Summer at 4,500 feet, but they were not then breeding.

Rothschild accepts Anderson's record of this bird in Yunnan, but this must surely be true *orientalis*.

Inghis records (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 562, 1902) this Dove's nesting in the plains of Behar :—"This year I was successful in securing this bird's eggs for the first time. I shot a male in March which was evidently breeding, and so had a good look-out kept wherever any of these birds frequented; it was not, however, until the 25th May that the first nest was received at Jainagar; it contained a single egg. On the 25th June a second nest was found near Baghowmie containing two eggs. Both nests were in Mango-trees."

This Dove breeds in almost any kind of country. Nests have been taken in gardens, orchards, Deodar- and Pine-forests, a few scattered bushes in scrub-forest, solitary trees and bushes.

As a rule the nest is placed fairly low down in small trees, saplings and high bushes. The favourite height is somewhere between 6 and 10 feet from the ground but, very often, it is built quite low down in scrub, brambles or clumps of bamboos only 3 or 4 feet from the ground. Occasionally it builds quite high up in tall trees and Hutton says "it makes a platform nest in tall forest trees."

A very curious instance of this Dove's nesting has been noted by Pitman, who writes to me that he "took a fresh egg at Nathea Gali on 10/5/12, but the bird had not troubled to make a nest, the egg being laid on some dry earth which had accumulated in the open hollow in the side of a trunk of a large tree; altitude 8,500 feet."

Nests and eggs are quite typical and call for no remark. It breeds principally in May and June; Hume says he has taken eggs from early May to late August, while I have had eggs taken on the 23rd April and again on the 14th September.

Forty eggs average 32.2×23.9 mm.: maxima 34.6×23.0 and 32.3×25.3 mm.; minima 28.9×23.4 and 34.6×23.0 mm.

(1872) *Streptopelia orientalis meena* Sykes.

THE INDIAN RUFOUS TURTLE-DOVE.

Streptopelia orientalis meena, Fauna B. I., Birds, 2nd ed. vol. v, p. 240.

The plains form of Rufous Turtle-Dove is found throughout Bengal, Bihar, Orissa and Assam. It occurs West as far as Chota Nagpur and it commonly ascends the outer hills of the Himalayas up to 4,000 and, rarely, 6,000 feet, as I have had quite typical specimens sent me with their eggs from the Darjiling District. West of Bengal it has been procured in Central India, the Deccan, North of about lat. 15° and, as a rare straggler only, in Central India. It probably never breeds in the Bombay Presidency, though it has twice been obtained at Mahabaleswar in that province. It is common over the greater part of Burma as far South as Tenasserim.

The nest and the site selected are quite typical of the genus, but the platform of twigs, which measures 6 to 8 inches across, occasionally has a slight depression for the eggs. I have taken nests from Mango-trees, single or in orchards; bushes and fruit-trees in gardens or in the cultivated lands round villages; in cane-brakes, scrub-jungle, secondary growth, forest or in scrubby bushes growing on the banks dividing rice-fields.

As a rule the nest is low down, most often between 5 and 10 feet from the ground, while I have found some within 2 feet of it and others, though very rarely, between 20 and 40 feet up in lofty trees.

Eighty eggs average 28.4×22.4 mm. : maxima 31.7×22.4 and 30.5×24.3 mm. ; minima 25.4×20.7 and 26.4×19.8 mm.

These Doves and, so far as I know, all other Doves of this genus, share the work of incubation, making the nest and feeding the young, the male indeed taking the larger share of incubation in the daytime.

The nest generally takes three to seven days to construct but, early in the season, the birds will often spend much time putting a few twigs in position and then pulling them all to pieces again, sometimes reconstructing the platform in the same place, at other times starting afresh in another site close by or even in the same tree or bush.

***Streptopelia chinensis* (Scop.).**

THE SPOTTED DOVE.

(1873) *Streptopelia chinensis suratensis* (Gmel.).

THE INDIAN SPOTTED DOVE.

Streptopelia chinensis suratensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 242.

This Spotted Dove is spread over the whole of India from the Himalayas to the South of Travancore, but more material is required to show if the birds in the extreme South are of this or the Ceylon race.

Ticehurst never came across this Dove in Sind, but I understand that in exceptionally wet years it sometimes appears, and it may have been in such a year that Capt. Malden recorded it as "pretty common"; at the same time I have never heard of it breeding there. It is common in Upper Assam, but in Cachar and the Surma Valley the birds very closely approach *tigrinus*, and to this latter race must be allocated the birds from Eastern Bengal, East of the Bay. It is common everywhere except in the driest parts of Rajpntana and, perhaps, certain other small areas of desert and waste. It occurs in the Himalayas up to 6,000 feet frequently and has been recorded breeding up to 8,500 feet, while it is not rare round Simla at 7,000 feet, where both Jones and Dodsworth took its eggs.

Occasionally they will place their nests on cornices or rafters in verandahs of houses. Hume says that now and then a nest may be found in ruined buildings, while I have twice also known of nests in verandahs of occupied houses; one of these was built on the broad upper part of a masonry post and the other on a cross-rafter, the latter in a very perilous position, from which it was blown down. The nest and its contents, two young, were replaced and successfully reared. The nest itself needs no more description than the statement that it is quite typical, but Thompson, in a long account of its breeding round Kuman, makes several interesting remarks which are worth quoting:—"The nest is composed of from 50 to 150 small twigs and roots laid loosely together, that portion of a bush

or tree being selected for the purpose which will give the broadest foundation, no matter whether it is the intertwining of many small branches or a hollow in a thicker one.

"On a nest being robbed the parent birds will forthwith set to work and build another, and if that be robbed in its turn, they will still go on seeking new sites, building new nests, and laying fresh eggs.

"The female sits very close on her nest, but if forced from it will sometimes fly down on the ground before the intruder, and will then mimic before his astonished gaze all the actions and efforts of a wounded bird trying to escape its pursuers, and thus endeavour to turn him from its nest."

In the hills the birds breed principally from April to July but, in the plains, the eggs may be taken during every month of the year, though in certain districts certain months are specially favoured.

In Rajputana, according to Barnes, September is the chief breeding month, while Butler endorses this and says that for Deesa September and October also are the two months in which he has found eggs. In the Konkan Vidal took eggs in October, January and April. In Bengal and Bihar they breed chiefly from November to June, but eggs may be taken in any month. In Assam I found April to June the best months for eggs and, finally, in the Nilgiris Miss Cockburn says they breed in March and April, while Cardew says they lay from February to September.

One hundred eggs average 27.2×21.8 mm.: maxima 29.7×22.4 and 28.2×24.1 ; minima 25.0×19.5 and 27.8×19.1 mm.

(1874) *Streptopelia chinensis tigrinus* (Temm.).

THE BURMESE SPOTTED DOVE.

Streptopelia chinensis tigrina, Fauna B. I., Birds, 2nd ed. vol. v, p. 244.

Tigrinus was originally described from Java, and the birds from this island to West Sumatra average a fraction larger than those from elsewhere, the Burmese and Northern birds having been separated as *minor*. In my opinion, however, the overlapping is so great that they cannot be differentiated. Their range, therefore, will include the above and then extend through the Malay States to Northern Burma, Bengal East of the Bay of Bengal and Manipur, Looshai Hills and Cachar.

There is practically nothing which can be said of this bird which has not also been written of the preceding. It makes the same kind of nest, which it places in similar positions, and lays two eggs, in any and every month of the year, which cannot be distinguished from those of the Indian bird.

Oates from Pegu, H. R. Baker from the Malay States, Harington and Macdonald from North-East Burma and Hopwood and

Mackenzie from the Chin Hills all speak of this bird as breeding more or less throughout the year, while this has also been my own experience in Cachar.

A note by Mr. C. W. Allan (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 523, 1909), writing from Henzada, is worth quoting :—"Yesterday, the 3rd March, I found two nests of the common Dove (*Turtur tigrinus*) built on the ground.

"The first I found in the morning whilst inspecting a timber-cutting in the Kyangin forest reserve. It was on the ground, right out in the open, under a teak-tree, and was of the ordinary kind, just a few twigs collected on some fallen leaves. There was no attempt at concealing the nest. There were two eggs in the nest freshly laid.

"The second nest I found the same evening. It was placed at the foot of a catechu (*Acacia catechu*) tree not far from my camp. The bird flew off as I approached the tree. There were two eggs in this nest also freshly laid."

This Dove seems to be rather fond of unusual sites for its nests. Edgar (Bull. Raffles Mus. Singapore, no. 8, 1933) records :—"I have not seen a nest actually on the ground, but one in January, 1926, was on a pile of sticks, not a foot high, in the middle of a padi-field. In February of this year I found a nest in a peculiar position. The padi-harvest was over, and the temporary huts in the padi-land had been vacated. Inside one of these huts was the usual small corner shelf of split nibongs, and on this a dove had built its nest and hatched out its young."

Fifty eggs average 27.6×21.9 mm. : maxima 31.7×21.0 and 27.6×23.8 mm. ; minima 26.0×22.0 and 27.4×19.3 mm.

(1875) *Streptopelia chinensis forresti* Rothschild.

THE YUNNAN SPOTTED DOVE.

Streptopelia chinensis forresti, Fauna B. I., Birds, 2nd ed. vol. v, p. 244.

This rather doubtful race was described from Yunnan, and Rothschild referred to it a bird from Katha in the Ruby Mines district of Burma. More material is required from this part of Burma to decide to which race the birds belong but, assuming the Katha bird to be correctly assigned, it would appear that we must place the Northern Kachin birds and, almost certainly, those from the Northern Shan States, under the same name.

Harington found it breeding freely at Myincyan and in the hills North-East of Bhamo, which is just a little West of the Tengueh Hills, where the type bird was obtained, and in continuous range with them.

A nest and eggs sent to me by Harington were taken on the 22nd September, and the former was built in a small bush in scrub-jungle outside a village at an elevation of about 4,000 feet.

So far as is at present recorded there is nothing to show that the nidification of this race differs in any way from that of the others.

The two eggs in my collection measure 28.0×21.5 and 28.2×21.4 mm.

(1876) *Streptopella chinensis ceylonensis* (Reichenb.).

THE CEYLON SPOTTED DOVE.

Streptopelia chinensis ceylonensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 245.

This little Dove is confined to Ceylon, where it is as common as its congeners are in other countries.

Whether the Travancore bird is the same cannot be decided on the material available. I think it will prove to be so, and Wait agrees.

There is nothing to note about this bird's nidification which differs in any way from that of the Indian bird. Its nest is the typical platform of the genus and is placed in bushes, trees, bamboos etc. just as the others are—again, like them, in gardens, parks, outskirts of villages or in thin and thick scrub etc. It breeds practically all over the island and in the hills up to 3,000 feet or more.

Phillips has seen a very large number of the nests and eggs and has sent me a fine series of the latter, but they call for no remark except that twice he has taken three eggs in a nest, in one instance the third egg being an abnormal soft-shelled one.

They breed presumably throughout the year. Wait says ('Birds of Ceylon,' p. 310):—"The nests may be taken at almost any time of the year. They are small, slight saucers of twigs, usually placed on thorny bushes or low trees, about 5 to 10 feet above the ground. Generally two eggs are laid but sometimes only one."

Phillips's series of eggs were taken principally in February and March, but he has taken them in each month from December to March and also in July, August and September.

Thirty eggs average 25.7×20.0 mm.: maxima 29.2×19.8 and 26.3×21.0 mm.; minima 23.7×19.8 and 25.2×19.0 mm.

Streptopelia senegalensis (Linn.).

THE LITTLE BROWN DOVE.

(1877) *Streptopella senegalensis cambayensis* (Gmelin).

THE INDIAN LITTLE BROWN DOVE.

Streptopelia senegalensis cambayensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 246.

This very common little Dove is found over the whole of India West of Calcutta. It does not occur in Ceylon but has been obtained on the Malabar coast and on Travancore, though it is rare and, perhaps,

only a casual straggler so far South. On the North-West Frontier this species breeds, but I believe it to belong to the next race; in Sind also it breeds in numbers but, here again, though *cambayensis* is common in Winter I believe the breeding bird to be *ermanni*. The only skin I have seen with eggs was large and pale, and I had no doubt was this bird, while the Quettah breeding bird also is, I consider, attributable to *ermanni*.

This is our most confidential little Dove, and probably eschews forest altogether as breeding ground. It is fond of nesting in gardens and parks, round towns and villages, in hedges in cultivation, odd bushes or tangles of briars and thorns in waste ground and, sometimes, in largish trees in orchards such as Mangos. Very often it makes its nest in buildings, both occupied and empty, and occasionally it has been found placed actually on the ground. It prefers dry climates and where the rainfall is heavy and the climate humid it is much less common. Thus in the wetter districts of Bengal it is rare. In Chota Nagpur, which is one of the most dry districts, it is more common. Inglis does not give it as occurring in Madhupore in Bihar, but it occurs in other districts of that province, though perhaps not commonly.

The nest is the usual little platform of twigs, sometimes mixed with grass-stems, with little or no depression for the eggs, measuring about 5 to 7 inches in diameter and from less than 1 to about 2 inches in depth.

Among the unusual sites selected for nesting may be mentioned the following. Hume "found several nests of this species in the bristling crowns of young, wild date-trees (*Phoenix sylvestris*)."
Anderson records one nest built on a double rope inside his tent, but, unfortunately for the birds, the tent had to be struck when the nest was ready for eggs. The rope, double for some six inches, was just broad enough to allow of the nest being balanced on it. Another nest was built on the window-sill in his office room, in which the birds brought up their two young successfully. I have also heard of a nest built behind a picture in a drawing-room and of another built between the antlers of a deer's head against a wall. More than once the birds have tried to build their nests on the roll-up blinds, called *chics* in India, where they are used to keep out the sun. Dewar, in his 'Birds of the Plains,' relates the history of one of these nests. In this instance the little Doves built their first nest and reared two young in it whilst the *chic* was rolled up; later, when it was let down in the hot weather, they stuck to the site and actually built another nest in which they reared no less than three broods and, finally, a pair of domestic Pigeons whose eggs had been substituted for their own.

Butler records two nests built about 2 yards apart in a net placed round a verandah to prevent the entry of bats, a position which necessitated the birds fluttering along inside the net for 9 or 10 yards every time they entered or left.

Sometimes these Doves nest on the ground, and there have been several records of such nests. Mr. B. Aitken wrote to Hume about one as follows :—" I once found a nest of *T. senegalensis* in a most unusual situation. It was on the ground at the top of a ditch in a plain covered with short grass. Not a stick or straw had been carried to the spot, but the grass as it grew had been worked into a very neat nest."

More recently Mr. Fenton has recorded (Journ. Bomb. Nat. Hist. Soc. vol. xx, p. 220, 1910) :—" I found some years ago at Chorwar in Kathiawar, the nest of *Turtur cambayensis* placed on the ground, on a large bare plot surrounded by the ordinary Indian cactus. The nest contained two young birds. Besides the almost impenetrable jungle of cactus round the spot, there were only a very few low bushes and stunted trees in its near vicinity." Cactus hedges, we may add, form favourite sites for nests in many districts.

This Dove, and many other Doves and Pigeons, often place their nests in the same tree, or close to one, occupied by one of the Raptores, and in some cases actually close to a branch in which a Laggar Falcon has its nest, yet the Falcons never attack the birds or steal the young, although Pigeons and Doves are their favourite prey. Moreover, the Falcons must recognize the particular Doves living under their protection at great distances, as they show no excitement at their approach and the Doves or Pigeons fly carelessly to their nests as if no bird of prey were anywhere near them. What this wonderful law of Nature is many observers have wondered, but that it exists no one can doubt.

The breeding season is more or less perpetual, and some pairs of birds will rear as many as half a dozen broods in the season. Probably the favourite seasons are two, the first February to April, the second September to November. In the hills, naturally, the breeding season is more definite, most eggs being laid between April and October, and in the highest elevations, which are 5,000 to 6,000 feet, April to August.

Two eggs are, of course, the normal clutch, but there are several records of three eggs, and sometimes one only is incubated.

Sixty eggs average 25.3×19.3 mm. : maxima 27.2×20.0 and 26.7×20.9 mm. ; minima 22.0×18.2 and 23.0×18.0 mm.

Both birds, as usual, build the nest and incubate, but there is no record as to how long incubation lasts.

(1878) *Streptopelia senegalensis ermanni* (Bonap.).

THE PERSIAN LITTLE BROWN DOVE.

Streptopelia senegalensis ermanni, Fauna B. I., Birds, 2nd ed. vol. v, p. 247.

This race of the Little Brown Dove occurs within our limits in Sind and the frontiers of Afghanistan, Baluchistan and, outside our limits, in Turkestan, Mesopotamia and Persia to our boundaries.

In Sind, according to Ticehurst, a Dove of this species breeds freely from March to June and again sometimes, in a good monsoon, in July. Which was the race breeding Ticehurst was unable to decide (Ibis, 1923, p. 465), but I have little doubt it was *ermanni*. In Quetta Williams and Betham found this bird very common, breeding in great numbers. The former writes (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 611, 1929) :—"This little Dove is resident throughout the Quetta Valley and only moves down the passes if the winters are too severe and the snowfall too heavy.

"It starts nesting early in Spring and continues all through the Summer and early Autumn. Its nest is the usual classic structure 'two twigs and a cross stick,' and the eggs laid in it are the prevailing type of its down-country cousin."

The only remark that need be made about its nest is that it has never been known to be built in houses or verandahs, but that Bell told Ticehurst that he had found several nests on the ground.

Harington took a nest at Peshawar, presumably of this race, on the 26th April and, so far as recorded, it seems that eggs may be laid any time between April and October but never in the Winter months.

Twelve eggs average 25.4×20.2 mm., and it is interesting to note that they average larger than the typical form, as does the bird itself, the greater proportional breadth being especially noticeable. Maxima 27.0×21.1 and 26.3×21.2 mm.; minima 24.0×19.4 and 25.0×19.3 mm.

Streptopelia decaocto.

THE INDIAN RING-DOVE.

(1879) *Streptopella decaocto decaocto* (Frivaldszky).

THE INDIAN RING-DOVE.

Streptopelia decaocto decaocto, Fauna B. I., Birds, 2nd ed. vol. v, p. 248.

This Dove has an enormous range, from Turkey and Serbia in Europe, through Western Asia, to India, China and Japan. It is found all over India and Ceylon except in the wettest areas such as the Malabar coast and the North-East Himalayas. It is a rare bird anywhere in Assam, and the birds in the districts East of the Bay of Bengal must, I think, be referred to the Burmese race, *xanthocyclus*. In South-West India Bourdillon found it in the dry area near Cape Comorin and Davidson only once saw it in Kanara. It ascends the hills up to some 8,000 or 9,000 feet, though it is seldom found breeding much above 4,000 feet. It is a bird of open cultivated or waste land and often also breeds in the bushes and scrub surrounding villages or in the gardens of European houses. I have no record of it ever breeding in forest. The nest is placed in most cases in thick bushes, prickly ones being especially affected, cane-brakes, bamboo-clumps or small saplings. Hume notes :—"The

nest is placed in any bush or tree, prickly or thorny sites, such as are afforded by the *Zizyphus*, wild date, babool, *Euphorbias* etc. being often, but by no means universally selected. Generally the nest is within 15, not very rarely within 5 feet of the ground but again, I have found it 30 or 40 feet up in a large tree."

It never makes its nest in buildings, but Souilly says that it sometimes places it on the top of old walls in Turkestan.

Anderson once found the nest on the ground, shooting one of the parent birds. It was placed on the bare ground, a sandy dome covered with a low flowering grass, the seeds of which form a favourite food of this Dove.

The nest is quite normal but occasionally rather more compact and well built than is usual with Pigeons and Doves, and sometimes has a defined cup for the eggs.

The breeding season is perpetual. Inglis in Bihar has taken eggs in every month of the year except February; Bingham says they breed all the year round in the Punjab; Hume took eggs every month from December to August, and so on. In Bengal and some other districts in which the rains are very heavy I think few birds lay in July, August and September, while in the hills they do not lay in the Winter months. All pairs have at least two broods and many have four or five.

The eggs also are typical, two normally and exceptionally only one or three.

Sixty eggs average 30.1×23.2 mm.: maxima 32.2×23.9 and 32.1×25.0 mm.; minima 27.8×21.8 mm.

There is no record of its incubation period but this, I am nearly sure, takes thirteen days. Nests with eggs, of which the second was laid on the 3rd June, contained young apparently two days old on the 18th of that month.

(1880) *Streptopelia decaocto xanthocyclus* (Newman).

THE BURMESE RING-DOVE.

Streptopelia decaocto xanthocyclus, Fauna B. I., Birds, 2nd ed. vol. v, p. 249.

The Burmese Ring-Dove is found over the whole of Burma, whence it extends into South and Central China through the Indo-Chinese countries. It is also the form which occurs in Tippera and Chittagong, districts of Bengal, East of the Bay of Bengal.

The nidification and general breeding habits of the Burmese race of Ring-Dove differ in no way from that of the Indian. It keeps much to open country and especially to cultivated and waste land round villages. Harington says that it is most common in the dry central zone, but it is also found throughout the Northern hills from the Chin Hills and Upper Chindwin to the Shan States, ascending at least as high as 4,000 feet. Macdonald, Hopwood and others have taken nests from sites exactly similar to those

selected by the Indian bird, while the nests and eggs are indistinguishable from those of that bird.

Like that bird, also, they must breed all the year round, as I have eggs, or records of eggs, for every month from January to August and again for October and November.

Ten eggs average 29.6×24.1 mm. † maxima 31.1×25.6 mm.; minima 27.0×23.0 mm.

Cenopopelia tranquebarica.

THE RED TURTLE-DOVE.

(1881) *Cenopopelia tranquebarica tranquebarica* (Hem.).

THE INDIAN RED TURTLE-DOVE.

Cenopopelia tranquebarica tranquebarica, Fauna B. I., Birds, 2nd ed. vol. v, p. 250.

The distribution of this Red Turtle-Dove includes practically the whole of India, while it has once been recorded from Ceylon. In the North-West it is common in Sind, Rajputana and the Punjab, and Harington found it breeding on the North-West Frontier at Peshawar. East it is found as far as Eastern Bengal, but not in the hills of Nepal, Sikkim and the Bihar Terai.

Although not *quite* such a confiding little bird as the Spotted Dove and Little Brown Dove, its habits do not differ very greatly from those of these birds. Sometimes its nest may be found in, or in the immediate vicinity of, towns and villages and even in gardens but, for the most part, it prefers well-wooded waste land or cultivated tracts away from human habitations, while it has also been known to breed in thin forest.

Hume says, and very rightly, that this Dove is most capricious in its choice of habitat:—"It is very common in the bare arid treeless region that surrounds the Sambhur lake. It is common in some dry well cultivated districts. It is very common in some of the humid tracts like Bareilly, and again in the Sâl jungles of the Kumaon Bhabar. On the other hand over wide extents of similar country it is scarcely to be seen" ('Nests and Eggs,' vol. iii, p. 360).

The sort of tree selected for nesting purposes varies in different places. Hume "always found the nests at or near the extremities of the lower boughs of very large trees, at heights of from 5 to 15 feet from the ground, and laid across any two or three convenient branchlets." In Sind Butler "noticed nests innumerable on the Babool trees below the camp." Cripps once found a nest in a clump of bamboos near a cultivation hut, and they have also been taken from bushes, especially thorny ones, palms, cacti, canebrakes and saplings. Barnes records some curious sites. He says: "I have taken nests both before and after the rains, but I think

the majority breed just after the rains. I have always found the nests in small trees, well in the jungle—acacia trees for preference. The nest is very frail and the eggs are usually visible from below. I have taken the eggs from old Crows' nests, and once found a nest in the foundation of a Tawny Eagle's nest, which had on the other side a nest of the Common Munia."

Most nests are made of twigs only, some of twigs and grass-stems mixed, and some of grass-stems only. One of these latter Hume describes as "a tiny network of grass stems so slightly put together that the eggs were clearly visible from below."

As a rule the nests are easy to find, but Betham writes from Ferozepore :—" Comes to breed in great numbers in the Hot Weather. The nest is usually situated high up in a tree and concealed from view by the foliage and, consequently, it is not easy to find."

In the hills it breeds from April to September and in the plains all the year round but, where the rainfall is exceptionally heavy, as in Bengal and parts of Assam, very few eggs are laid in July and August.

The full clutch is, of course, two, but three eggs or young have been frequently seen. Butler says that in Sind he has on several occasions seen three eggs and once three young birds, while in Deesa also he once found three eggs in a nest. Hodgson again says that in Nepal they lay "two or three white eggs." So many hundreds of nests of this Dove are seen annually that perhaps the few threes recorded above may merely indicate a "normal abnormality" but, on the other hand, it may mean that this Dove does lay three eggs rather more often than do other Doves.

Forty-nine eggs average 25.9×19.9 mm. : maxima 29.0×20.0 and 24.3×21.2 mm. ; minima 23.9×21.0 and 23.1×18.6 mm.

(1882) *Œnopoelia tranquebarica humilis* (Temin.).

THE BURMESE RED TURTLE-DOVE.

Œnopoelia tranquebarica humilis, Fauna B. I., Birds, 2nd ed. vol. v, p. 251.

The Burmese Red Turtle-Dove occurs in Assam South of the Brahmapootra, the whole of Burma, the Andamans and the Indo-Chinese countries to South China, while South it is found as far as Pakjan in the Malay Peninsula.

Its nidification exactly resembles that of its Indian cousin ; it breeds in the same kinds of places and makes a nest of the same description.

It probably breeds also over the greater part of the year but, so far, most eggs have been taken between April and June in Burma, while Osmaston took eggs in the Andamans from February to April.

It was common in North Cachar up to 2,500 feet, though rare over 3,000 or 4,000 feet, and I took many nests but, except that it was

more addicted to scrub-jungle, secondary growth in cultivation etc. than its Indian cousin, I found nothing to remark on in its breeding habits.

Harington, in a letter to me, wrote :—"I found several nests built close to those of Drongos, both *D. ater*, *D. cinerascens* and also *Chibia*, evidently built in these positions for the sake of the protection given by these pugnacious little birds."

This, again, is an interesting record of a characteristic not only of the present bird but also of most other tree-building Pigeons and Doves. We also find the same thing occurs with the rock-breeding species, and a colony of Rock-Pigeons often breed close to the nesting haunt of a pair of Peregrines, who live principally on Pigeons yet never interfere with the colony alongside their own nest.

Forty eggs average 26.4×20.4 mm. : maxima 29.5×20.8 and 27.4×22.4 mm. ; minima 24.4×20.2 and 24.5×18.8 mm.

(1883) *Ænopenelia tranquebarica murmensis* Hartert.

THE SIKKIM RED TURTLE-DOVE.

Ænopenelia tranquebarica murmensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 252.

This bird was described by Hartert from Nepal, and it extends East through the outer Himalayas as far as Eastern Assam, where it breeds from the plains up to an elevation of about 4,000 feet. There is nothing on record about its breeding beyond Hodgson's remarks that "it lives and breeds in the lower valleys and the Sal-forests of Nepal, and lays from January to May two or three white eggs."

I found a few nests of this race in Tezpur and North Lakhimpur, and these differed in no way from those of the other races. One nest I took was on a small tree, very exposed, on an open grass plain and quite close to a steamer station on the North Bank of the Brahmapootra ; another was in a small tree in a spinney on a rocky island in the Subansiri ; while a third was in a bush at the edge of forest next to open tea-land in the foot-hills of the Himalayas. These three form good examples of the variety of sites chosen, and all were under 12 feet from the ground, that in the bush being only about 4 feet.

I have taken eggs from March to May and Primrose took a clutch at Kurseong on the 14th May, but I have no doubt the full breeding season is much longer than these three months.

I have been able to measure only ten eggs. These average 27.3×20.8 mm. : maxima 28.9×21.8 mm. ; minima 25.7×20.5 and 27.0×20.2 mm.

One or two of my eggs of this race, as well as a few of the other races, have a very faint ivory tinge, only to be noticed when placed alongside very glossy white eggs.

Macropygia unchall* (Wagler).*THE BAR-TAILED CUCKOO-DOVE.**(1884) ***Macropygia unchall tusalia* (Hodgs.).****THE INDIAN BAR-TAILED CUCKOO-DOVE.***Macropygia unchall tusalia*, Fauna B. I., Birds, 2nd ed. vol. v, p. 253.

This curious Dove has a wide distribution, being found from Kashmir, Kuman, the Simla States and Garhwal to Eastern Assam, both North and South of the Brahmapootra. It then ranges through the hill-tracts of Burma to about Muleyit Mountain, and is common in the Shan States, straggling into Siam.

This is purely a forest-bird, and I found it common in Assam in the stunted oak forest between 4,000 and 7,000 feet, while Osmaston records it as one of "the most common species of dove in the middle hills, about 7,000 feet" (Darjiling). They breed from 3,000 feet upwards, but principally between 5,000 and 7,000 feet and up to 9,000 feet.

The nests were quite typical Doves' nests, platforms of fine twigs, but I think they are better and more substantially built than those of most birds of this family. The twigs are quite well interlaced, the whole structure deeper in proportion, while there is a distinct depression for the eggs, sometimes lined with fine grass-stems and roots, which latter are also often used in the body of the nest. I have also more than once found dry moss in the lining. The twigs seem generally to have been torn from living trees and are, therefore, more pliant and more easily interlaced than dry twigs.

Hodgson calls the nest "a large loose platform-nest of sticks, a foot in diameter and 3 inches in thickness." The nests found by myself were smaller than this, yet deeper, and probably averaged 9 or 10 inches across by at least 4 inches deep. Nearly all the nests in the Cachar and Khasia Hills were placed in small trees, either saplings or small stunted Oaks, at heights between 6 and 16 feet from the ground; a few were in thick bushes still lower, while occasionally a nest was found between 20 and 30 feet up in taller trees. Osmaston found them breeding in similar situations about Darjiling, taking nests between 10 and 15 feet from the ground (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 515, 1904). Robinson, however (Journ. Fed. Malay States, p. 54, 1905), records a nest "placed on bracken leaves not far from the ground in dense bamboo and undergrowth."

In the Darjiling district Gammie says he found them breeding between 2,500 and 4,500 feet, the lowest elevations recorded, though the nest taken by Wardlaw Ramsay near Tounghoo in the Karen Hills could not have been much higher.

The breeding season is late for this family, and only a few birds start in April, most laying in late May, June and July, while I have taken eggs as late as the 12th September. Gammie and Osmaston found them breeding about Darjiling in June and July, as did

Theobald, but in the Karen Hills Wardlaw Ramsay obtained a nest on the 18th March.

Over the Western portion of its range this Dove lays one egg only, but over the Eastern portion from South Assam into Burma it often lays two. In North Cachar it very often laid two eggs, and Wardlaw Ramsay also found two in a nest.

The eggs are of two types, one a long and narrow oval, almost elliptical in shape, the other narrow and very distinctly pointed, quite unusually shaped eggs for this family. The texture is very fine and close and the surface often quite glossy. In colour they are a very pale buff, pale *café-au-lait* or creamy, never white as described by Theobald and Wardlaw Ramsay.

Two hundred eggs average 35.3×25.4 mm. : maxima 38.1×26.2 and 37.1×27.6 mm. ; minima 30.4×25.3 and 34.2×19.8 mm.

Both sexes incubate and both assist in building the nest, which takes about a week to complete.

The display of the male is interesting. He perches on one of the topmost twigs of the tree where his lady-love is sitting and then, suddenly, with much clapping of wings above his back, launches himself high into the air. When he has risen to a height of some 50 feet or so he spreads his wings, puffs out his feathers until the shiny ones of his rump stand out like a lady's powder-puff, and then sails slowly down in a spiral to his original perch. There he rests for a few moments, booming occasionally, and then once more goes through the same performance.

I believe they pair for life—probably most species of birds do—for they are always to be found in pairs and, where one bird is, the other will not be far off.

(1885) *Macropygia rufipennis* Blyth.

THE ANDAMAN CUCKOO-DOVE.

Macropygia rufipennis, Fauna B. I., Birds, 2nd ed. vol. v, p. 255.

This Cuckoo-Dove is restricted to the Andamans and Nicobars and is very common in the former.

All that we know about the breeding of this bird is that Davison found a nest of which he says: "I have never found the nest of this bird, nor could I obtain any authentic information as to its nidification, beyond that it breeds about May, building among the mangroves on the island of Trinkut. I found a nest, and from the sight I got of the bird as she left the nest I put it down at once as that of the present species; but a few days later I found a nest exactly similar, and containing exactly similar eggs, and off this nest I shot a female *Chalcophaps indica*, so I infer that the first nest also was one of *C. indica*."

Now, however, that we know so much more about the breeding of other *Macropygias* there can be no doubt that Davison, who saw the bird, was right in his first impression.

I have a single egg in my collection said to have been taken on the 22nd April in the Abbot and Kloss Expedition to the Nicobars. This is like a small elliptical egg of *tusalia* and measures 34.0×23.0 mm.

***Macropygia ruficeps* Temm.**

THE LITTLE CUCKOO-DOVE.

(1886) ***Macropygia ruficeps assimilis* Hume.**

THE BURMESE LITTLE CUCKOO-DOVE.

Macropygia ruficeps assimilis, Fauna B. I., Birds, 2nd ed. vol. v, p. 256.

The Burmese Little Cuckoo-Dove is found from Karenni and Shandoung in Pegu South to Muleyit. It also occurs in the Shan States and has once been reported in Siam.

My summary of its breeding in 'Pigeons and Doves' (p. 250, 1913) still contains all that is known about it with the exception of a nest and egg taken by Hopwood on the 14th May at Nwalabo, in South Tenasserim, at 3,500 feet elevation. The first record of this little Dove's breeding is that of Mr. S. M. Robinson (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 250, 1912):—"Higher up the hill, after the undergrowth had ceased, in bamboo-jungle consisting of separate clumps of 6, 8 or 10 bamboos and quite open, I saw a pad of moss where the bamboo shoots take off in a cluster. On going up a long-tailed Dove flew off. I waited 25 minutes and shot it practically on the nest. This consisted of a flat pad of moss, almost quite hard, about 12 feet up the bamboo. It was difficult to get the egg as I expected it would roll off every minute as we telescoped the bamboo.

"The egg measured 1.26 by $.84$ in., a perfect ellipse, and cream tinted with very faint coffee-colour."

On the 25th of the same year and in the same place Mr. J. P. Cook found a second nest with one hard-set egg. The nest, like the last, was placed high up on a single bamboo but, unlike that taken by Mr. Robinson, was of the usual type, "composed of a very scanty collection of twigs." The egg unfortunately got broken in taking it down from the nest.

The nest taken by Mr. Hopwood is said to have been made solely of moss and moss-roots and to have been found in a bamboo clump. This egg measured 29.1×21.0 mm. and is a creamy *café-au-lait* in colour.

The other eggs described in 'Pigeons and Doves' all refer to the typical race, *M. r. ruficeps*. These were taken from nests made of twigs with moss in the base, and sometimes almost entirely of this material.

Geopelia striata.**THE BARRED GROUND-DOVE.****(1887) *Geopelia striata striata* (Linn.).****THE JAVAN BARRED GROUND-DOVE.***Geopelia striata striata*, Fauna B. I., Birds, 2nd ed. vol. v, p. 258.

This tiny and pretty little Dove is a resident bird from the South of Tenasserim, throughout the Malay Peninsula and the islands, to Java.

The birds of this genus frequent open country, cultivated fields and the outskirts of villages. Robinson says (Journ. Fed. Malay States):—"The general habits of this little Dove are the same as those of *tigrina*. It keeps about cultivation and feeds on the ground, walking about here and there and picking up seeds."

I can find no record of its breeding in Tenasserim, but I have secured many nests and eggs from the Malay States and islands. The nests are tiny platforms of thin twigs and bents only about 4 inches in diameter by an inch or less in depth, very flimsy in character and built on low bushes, often thorny ones growing in scrub- and bush-jungle or, less often, on bamboos in bamboo-forest. In Java Houwing tells me they breed freely in the coffee-trees and rubber-trees in the plantations.

In the Malay States they breed in January and February, in Borneo in March, in Siam in June and in Java in July and August; in all these places, however, it is more than possible they also breed in other months, and may have just as long a breeding season as most other Doves. Edgar (Journ. Raffles Mus. no. 8, Dec. 1933) says:—"I have found nests from December to May, and saw a bird carrying nesting material on the 23rd May." This note refers to Perak birds.

The eggs, two in number, are quite typical little Doves' eggs, pure white, general'y rather long ellipses, occasionally broader and with normal texture and smooth surface.

Twenty-eight eggs average 22.1×17.1 mm.: maxima 24.4×18.2 mm.; minima 19.3×14.3 and 20.6×14.0 mm.

Order V. PTEROCLETES.

(SAND-GROUSE.)

Family PTEROCLIDÆ*.

(SAND-GROUSE.)

(1888) *Pterocles orientalis* (Linn.).

THE LARGE, IMPERIAL, or BLACK-BELLIED, SAND-GROUSE.

Pterocles orientalis, Fauna B. I., Birds, 2nd ed. vol. v, p. 262.

The breeding range of this fine Sand-Grouse has not yet been proved to extend to India, unless one accepts Chaman, now in the Baluchistan Agency, as sufficing. Barnes, writing of Chaman (Str. Feath. vol. ix, pp. 218 & 458, 1880), says:—"The Large Sand-Grouse is very common. I found them breeding in May. The eggs, three in number, are, as regards shape and colour, exact counterparts of those of *Pterocles exustus*, but are of course much larger." The eggs are certainly not "exact counterparts of *exustus*" in colour and, as it is always possible that they *may* be found breeding in Sind or Baluchistan, I give the following description of them.

They are typical true ellipses in form. The ground-colour varies

* Three important papers have recently been written on this family, introducing two new genera. The first of these is one by Austin Roberts (Annals Transvaal Mus. vol. viii, pt. 4, pp. 194-8, October 1922). In this he creates the genus *Nyctiperdix* and designates the type as *Pterocles bicinctus*. The second and third papers are by Bowen (Annals Mus. Novitates, no. 273, September 1917, and Academy Nat. Sci. Philadelphia, vol. lxxxii, pp. 145-67, June 1930). In the first of the two latter papers Bowen creates the new genus *Dilophus*, and in the second he incorporates in Austin Roberts's new genus *Nyctiperdix* two of our Indian species, *indicus* (= *fasciatus*) and *lichtensteini*. Although I am not adopting this new genus in the present work there is no doubt that there is much in the life-history of the Sand-Grouse to emphasize the very slight structural differences on which the genus is based. Bowen give as a key to *Nyctiperdix*:

- 6 A. First primary not less than $\frac{2}{3}$ longest..... *Nyctiperdix*.
 B. First primary not more than $\frac{1}{2}$ longest..... *Pterocles*.

Our Indian species show other characters which help to differentiate the two species. In *Nyctiperdix* the wing is shorter and more rounded, the plumage rather more lax and soft, both characters pointing to a more sedentary life, such as is actually the case. The barred breast again helps to separate the two, and these physical differences are correlated with different habits, habitat, flight, voice and also nidification. From what I have written the reader may think I should adopt this genus, but Sand-Grouse are few in number and, for the present, I refrain from adding to the genera until it is actually necessary.

from greyish stone-colour, pale dull cream, pale yellowish-grey, pale buff or greenish-grey to a rather warm buff stone-colour, sometimes tinged with green. As a series the pale dull tone is the dominating feature. The primary markings consist of indefinite smudges, blotches and spots of reddish-brown, dull grey-brown or dull rufous-brown, the edges often paler and merging into the secondary markings, which are pale lavender-grey or purplish-grey. The markings of both kinds vary considerably in amount, sometimes being rather sparse, at other times numerous, but they are always more or less evenly distributed over the whole surface.

Seventy-eight eggs average 47.5×32.3 mm.: maxima 53.2×31.2 and 50.0×36.6 mm.; minima 43.5×30.8 and 47.6×30.2 mm.

It is of course impossible to say exactly when one would expect them to breed in India but, most probably, it would be in the hottest time of the year, in May and June.

Williams was sure that these birds bred near Quetta, and he writes (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 611, 1829):—"In certain localities it undoubtedly breeds freely, especially on the Mastung and Pishin plains, and a large number also breed in the low sand-bills to the West of Quetta, but many a tiring day ended in a futile search for eggs."

(1889) *Pterocles indicus* (Gmelin).

THE PAINTED SAND-GROUSE.

Pterocles indicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 264.

This beautiful bird is found over the greater part of Western India and Central India North of about the centre of Bombay. It is common in Kanara, the Deccan, Central Provinces, Rajputana, Cutch, the North-West Provinces and the Punjab. To the East it has occurred as far as the Santhal Parganas, Ranchi, Hazaribagh and Gya. In the North-West Barton records it as occurring every year at Rustom near Mardan; it has been shot near the Orakzai, and Whitehead records one of a pair being shot at Shinauri, 3,800 feet, on the North-West Frontier (Journ. Bomb. Nat. Hist. Soc. vol. xx, p. 968, 1911).

This Sand-Grouse is a resident bird wherever found except, possibly, on the outer fringes of its ordinary habitat. It is not a desert-breeding bird, although it is essentially one of dry country and is never found in really wet districts. It breeds in broken country, stony hillsides and rocky ravines, but never in those without a certain amount of bush- or scrub-jungle, while Hume says that during part of the year they are to be found in the forests of the Deccan. Even here, however, Sparrow and others have found them breeding principally in stony ravines more or less covered with scrub-jungle. Adam says that it "is common about the low

ranges of hills near the Sambhur Lake and doubtless throughout the Aravalis. Sometimes it is met with under the shade of the 'toi' (*Euphorbia royleana*) about halfway up the hills, but as a rule small parties are flushed at or near the base of the hills, where the ground is mostly stony."

The nest is, as a rule, a mere scratching in among the stones and earth, rarely with a little grass or a few leaves in the hollow, which are most likely only wind-blown. Thompson is the only collector ever to have found anything more than this. He writes:—"The nest was placed on the ground on a slight rise; neatly and well put together, saucer-like, made of dried grass, bits of dried leaves of bamboos and other plants. The soil was sandy, with a thin forest growing on it, and the nest was placed under the shadow of a small tree." Such a nest may be accepted as quite abnormal.

As a rule the eggs are laid under the protection of a bush, tree or some clump of grass or other vegetation, or where a stone or boulder gives some shade during the hottest hours but, even this, is by no means always the case, and sometimes they are placed right out in the open, when shade and protection are easily obtainable in the immediate neighbourhood.

The principal breeding season is probably April, May and June, but eggs have been taken at odd times throughout the year.

The following shows dates and places where taken and by whom:—

January	....	Pythian-Adams and Davidson (Khandesh).
February	....	Pythian-Adams and Davidson (Khandesh), Butler (Guzerat), Bingham (Bombay Pres.).
March	.....	Hume, Adam (Aravalis), Pythian-Adams, Bulkley (Cutch), Sparrow (Deccan), Davidson and Wenden (Khandesh).
April	.....	Adam (Aravali), Pythian-Adams, Bulkley (Cutch), Sparrow (Deccan).
May	.....	Bingham; Sparrow (Deccan).
June	.....	Barnes (Bombay), Felton (N. W. F.).
August	.....	Betham (Poona).
November	....	Thompson (Chanda), Davidson (Khandesh).
December	....	Pythian-Adams.

The number of eggs laid is three, sometimes two only. The shape is a true ellipse; the texture is close and hard and the surface often highly glossed. They are very beautiful and remind one at once of the pink type of Nightjar's eggs, which they resemble very closely except in size.

The ground-colour varies from pale cream, pale salmon or salmon-buff to a warm salmon or salmon-buff; a few eggs having a more yellow tinge and still fewer being very dull in tint, almost a grey-salmon. The markings vary considerably also. In most they consist of primary blotches, specks and smudges of

some shade of light red to brownish-red, with secondary similar marks of inky grey or lavender-grey. In most eggs these latter marks are the more numerous and dominate the tint but, in a few, the primary marks are bolder, darker and more numerous.

A remarkable pair taken by Vidal at Nassic has the ground pale cream, the whole surface covered with numerous hold though small blotches of bright red-brown or chestnut, with equally numerous secondary ones of grey and lavender. Another unusual clutch taken by Sparrow in the Deccan has very few primary markings but many secondary, one egg looking as if it had been dropped in ink and half washed.

A still more curious pair has the ground-colour a dull pale sea-green with a few faded blotches and spots of grey and brown scattered here and there over the surface.

Eighty-eight eggs average 35.8×25.0 mm.: maxima 40.0×27.0 mm.; minima 33.0×24.6 and 35.0×23.4 mm.

Both sexes incubate, and the method by which this species, and apparently all others, obtain moisture to damp their eggs is explained later on under *Pterocles alchata caudacutus*. I have no certain record of the period of incubation in a wild state, but apparently it takes from twenty-one to twenty-three days. The birds sit very close, and during the heat of the day have been seen sitting on the eggs, the wings outspread and mouth wide open, panting for breath. Doubtless if the eggs were left for long in the heat of the midday sun they would soon be destroyed, but they are sometimes left uncovered after the morning chill has gone and before the coolness of evening falls.

Pterocles lichtensteinii Temm.

THE CLOSE-BARRED SAND-GROUSE.

(1890) *Pterocles lichtensteinii arabicus* Neum.

THE ARABIAN CLOSE-BARRED SAND-GROUSE.

Pterocles lichtensteinii arabicus, Fauna B. I., Birds, 2nd ed. vol. v, p. 265.

Within our limits this Grouse apparently only breeds in Sind and, perhaps, British Baluchistan. Its normal breeding area ranges from South Arabia to South Persia through Mesopotamia, and it is also resident in Afghanistan and Baluchistan.

The Close-barred Sand-Grouse is very similar to the Painted Sand-Grouse in habits and habitat, but is found in more arid, desert-like country, though never, so far as I can ascertain, in country which has no cover. It seems to prefer broken, stony ravines, with thin burnt-up grass or short bush-scrub, situated at the foot of hills or actually inside them. Eates tells me that they are not very uncommon all along the foot of the Habb Hills in semi-sandy semi-stony country, where in the ravines one finds a little tamarisk or a few thorny shrubs growing.

Ogilvie-Grant ('Game-Birds,' vol. i, p. 21, 1895) quotes Heuglin, who says he found some "nests" which contained "two cylindrical-shaped eggs, much the colour of dirty and faded Peewits' eggs." These were probably incorrectly identified.

There is also an egg of this species in the British Museum collection taken at Maroul hy Malan in 1851. This in general appearance is very like a small faded egg of *Pterocles alchata*.

Recently Eates has taken a clutch of three eggs in Sind, off which he disturbed the bird, and had another pair brought to him from the same locality. Of the c/3, which he most generously sent to me, and the other c/2 he writes as follows:—"The c/3 was taken by myself on bare pebbly ground on which there was growing a little sprouting tamarisk and some 'khandaro' thorn-bushes. The site selected was the bed of a dry hill-stream at the foot of the Habb-Pir-Mangho Hills, and the bird, when I disturbed it, flew fluttering off like a huge moth. All round the nest, which was just a scratching in the sandy-pebbly soil, there were numerous marks of the Sand-Grouse feet. A similar clutch of two eggs was brought to me later by my collector from the same place. I inspected the nest, which was just like the first and made in a similar position. This Grouse frequents the hills and ravines along the Habb, and has a peculiar moth-like flight, and only drinks after dusk has fallen."

Elsewhere he writes to me: "This bird has habits quite unlike our common Sand-Grouse and is never found quite out in the open, but always where there is some cover. I was sure they bred here in the scantily scrub-covered ravines, but much work resulted in nothing more than the occasional putting up of a bird without revealing nests and eggs. The flight of the bird is so unmistakable that, as it flutters away, its identification is easy, especially as nowhere here is the Painted Sand-Grouse to be met with. These two birds, the Painted and Close-barred Sand-Grouse, are curiously alike in habits etc., and at first I thought it was the former when I put a bird up, and it was not until I had shot one I found out what it was. I am sure it breeds here in some numbers, and if I could only manage to visit these ravines more often and at the right time I should be able to find many nests."

The three eggs sent me by Eates, as well as the two others, are of the Painted Sand-Grouse type, though I have none of that bird's eggs which exactly match them. The ground is a pale clear cream and they are numerously flecked all over with reddish-brown and with more numerous and slightly larger blotches of lavender-grey underlying them. In shape they are long-cylindrical, the texture fine and close and the surface rather glossy.

They measure 37.5×23.0 , 38.0×23.2 and 37.4×23.8 mm.

The c/3 was taken on the 4th May, the c/2 in the end of that month, but Eates thinks that probably more birds breed in June. What it is to visit these places where the birds breed in Sind during the awful heat of these months can only be appreciated by those who

have seen a tropical desert summer, and the elucidation of their breeding has only been obtained by intense perseverance, endurance and patience.

***Pterocles coronatus* (Licht.).**

THE CORONETTED SAND-GROUSE.

(1891) ***Pterocles coronatus atratus* Hartert.**

THE PERSIAN CORONETTED SAND-GROUSE.

Pterocles coronatus atratus, Fauna B. I., Birds, 2nd ed. vol. v, p. 267.

The range of this Sand-Grouse is from Arabia, (? Palestine), through Mesopotamia, to Persia, Afghanistan, Baluchistan and North-West India.

In India it occurs all along the North-West Frontier and in Sind to the South. It does not occur East of the Indus.

Little is known of the breeding of this Sand-Grouse, but it undoubtedly breeds in Sind, as I have two oviduct eggs in my collection taken from birds shot, one in Kotri and the other somewhere near "Sehwan" on the Indus. The history of these two eggs is as follows. The first, which I owe to the generosity of Mr. Chas. Inglis, was given to him by Dr. McMullen, who one day (24th April, 1907) shot two female Grouse with eggs ready for expulsion; one of these was taken from a Coronetted Sand-Grouse, the other from a Spotted Sand-Grouse. This was at Kotri. The other egg I purchased from the Bulkley collection after his death, and beyond "21. 5. 1890, Sind-Baluchistan Frontier" there were no other details with it. Harrington Bulkley once wrote and told me that he had the previous day taken an oviduct egg of this bird. This was written from Sehwan, and undoubtedly refers to this egg, but it may possibly have been shot at some distance from this place.

One egg is a pale grey very lightly blotched with brown and lavender-grey; the other egg is a darker yellow stone-colour more profusely marked with brown and grey and with a dense ring of brown spots at one end. They are of the usual texture and grain and the two measure 40.4×27.6 and 39.3×26.2 mm.

In Quetta Williams found it breeding, and records (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 611, 1929):—"It breeds in May and June in the wind-swept sand dunes tracts of the above-mentioned places (Mach and Kirtha, Saranan and Gulistan), its eggs being laid in a sheltered depression and no attempt being made to line the nest, if such it can be called.

"The eggs, three in number, are broad cylinders, rounded at the ends, of a close texture and glossy; the ground-colour is either a pale drab or stone, marked with sienna of varying intensity and having underlying clouds of pale inky purple.

"The average of six eggs is 430.7×3.0 mm."

Pterocles alchata (Linn.).**THE LARGE PIN-TAILED SAND-GROUSE.**(1892) **Pterocles alchata caudacutus** (Gmelin).**THE PERSIAN LARGE PIN-TAILED SAND-GROUSE.***Pterocles alchata caudacutus*, Fauna B. I., Birds, 2nd ed. vol. v, p. 268.

This fine Sand-Grouse is found in enormous numbers in India in the North-West Trans-Indus country and again between the Indus and the Chenab; it occurs in the Punjab as far as the Beas and the Gaza as far East as Ludhiana and Delhi, and South it has been obtained as far as Sambhur, Jodhpore, Bikanir and Deesa.

Outside India it ranges from Ahysinia and Nubia and the South Russian Steppes to Afghanistan and Baluchistan.

It has never been discovered breeding in India, but must surely do so sometimes, if not regularly. Bogle found it in pairs in Peshawar and shot a female in June with an egg ready for expulsion, and it also possibly breeds in the Quetta district. At the same time we have no places in India which resemble the huge mud-flats on which this Sand-Grouse breeds in such thousands in Mesopotamia. Pitman, when advancing on Kut-el-Amara in June and July, refers to one of the halting places as "one huge breeding ground," the birds not selecting the barest places like the Spotted Sand-Grouse, but making the scrapes for their eggs on places growing grass, thin vetch or the Polygonum, the seeds of which form their staple food. Vast multitudes breed in the same area, many nests being within a few yards of one another, placed without regard to any special shelter. Many millions of pairs must breed in the Tigris Valley, for day after day the troops were passing through breeding country in which the birds literally swarmed.

In Mesopotamia they bred from early May to the middle of July, but most birds laid in the last week of May and the first two of June.

Three eggs are generally laid, but sometimes two only.

I described the eggs in the 'Fauna' as follows:—"They are the boldest and most richly marked of all Sand-Grouse eggs. In ground-colour they vary from a pale cream or yellowish-stone to a bright warm buff or salmon-pink. The primary markings consist of bold blotches and a few specks of vandyke-brown or deep red with light grey or neutral-tint secondary markings. These are numerous and generally distributed all over the surface, in a few eggs being more numerous at the larger end. In shape they are nearly true ellipses." One hundred eggs average 45.0×30.4 mm.: maxima 49.9×29.9 and 40.1×33.3 mm.; minima 39.6×28.3 and 46.1×28.0 mm."

*Both birds incubate, and probably the male does more of this.

work than the female. Both sexes also help to scratch out hollows in the ground but, as the birds do this constantly when resting, dusting etc., it is possible that only the female prepares the scrape in which the eggs are laid.

Most interesting accounts have been written of the manner in which Sand-Grouse give their young drink, and it is obvious that the same method serves to damp the eggs from time to time throughout incubation, an act essential to their successful hatching.

Meade-Waldo was the first to observe this and, as it is a characteristic of all Sand-Grouse and applies equally to all our Indian birds, I deal fully with it here.

In 1896 ('Zoologist,' p. 299) Meade-Waldo gave an account of the breeding of *P. alchata* in confinement, and describes how the male, after the young were hatched, would "rub his breast violently up and down on the ground, a motion quite distinct from dusting, and when his feathers were all awry would get into his drinking-water and saturate the feathers of his underparts. When soaked he would go through the motions of flying away, nodding his head etc. Then, remembering that his family was close by, would run up to the hen, make a demonstration, when the young would run out, get under him, and suck the water from his breast."

Later (Avicultural Mag. 1906, p. 219) Meade-Waldo gave a further account of this procedure, which is so interesting that I quote it in full:—"Incubation lasts from 21 to 23 days, the hen sits by day, the cock taking her place by night, usually going on the eggs about 5 P.M. Both parents brood the young when they are very small.

"The extraordinary method employed by the parent male Sand-Grouse of conveying water to their young by saturating the feathers of the breast was first described by me in 1896, and since by Mr. St. Quintin in his interesting account of the successful rearing of *P. exustus*. I have had the good fortune to see the males of *P. arenarius* and *P. alchata* getting water for their young in a wild state, but had I not seen it administered in confinement would have considered them demented birds trying to dust in mud and water.

"In very waterless places this method of procuring water-must be most precarious, for I saw *P. arenarius* waiting by the wells and going to the muddy spot where the skins used to be laid before being loaded on to the camels, and where the water was slopped over from the troughs when the animals drank. I also saw them fly over the prickly Zareba surrounding the tent-villages and go to where there was a soft spot for the same purpose. I did (? not) see *P. alchatus* actually soaking themselves, but I repeatedly saw cocks pass over, their white breasts soaked in mud and water."

Pitman also made some useful notes on their habits and writes to me:—"About the question you ask me as to *P. a. caudacutus* giving their young ones drink during the breeding season. I often tried to watch the young ones when newly hatched and when

older, but had no luck, and never saw them drinking as Meade-Waldo describes. On the other hand, I have succeeded in rearing a large number of the chicks, and I found them to be very thirsty little creatures, drinking greedily more than once in a day when they get the chance. I have watched this Sand-Grouse drinking in their thousands in June and July, and I have noticed the birds go right out into the water and thoroughly soak the whole of their body-plumage underneath, so much so that it is perfectly noticeable when the birds are on the wing flying back from watering, as their breasts and bodies are bedraggled and muddy."

It should be noted, however, that for a great part of the time Pitman saw this performance going on the birds had eggs which had not hatched, so that the wetting of the breast would have served to damp the eggs, although not required to water the young.

Thornhill and Macgrath also refer to this habit of the birds in Mesopotamia. The latter says that he noticed the birds when drinking sometimes settled on the water, a pair so settling on the Tigris in front of him, and he remarks that "when on the water they floated high and looked like Gulls."

Pterocles exustus Temm.

THE COMMON SAND-GROUSE.

(1893) *Pterocles exustus erlangeri* Neum.

THE INDIAN COMMON SAND-GROUSE.

Pterocles exustus erlangeri, Fauna B. I., Birds, 2nd ed. vol. v, p. 271.

There seems nothing to add to the distribution given in the 'Fauna':—"In our own area it occurs practically everywhere in the plains where the rainfall is not too heavy. It does not occur in Ceylon, but is found in the open parts of Travancore, whilst Blanford found them near Trichinopoly. East it is found as far as Raneegange and Birhhum. It is common in parts of Sind and has been killed in Kashmir" (by Col. Faithful). Outside India it is found in South and South-West Palestine, South Arabia to Baluchistan.

Hume sums up its breeding haunts as follows:—"The Common Sand-Grouse breeds throughout the drier and harer portions of the more or less sandy plains of the Continent of India. Rocks and hills, forests and swamps, it equally eschews, and the haunts it best loves, and where its nests may be found in greatest numbers, are scattered fallow or stubble, or newly ploughed fields, dotted about on and surrounded by large semi-desert plains."

All I can add to this is that occasionally it does breed in practically desert country. Harrington Bulkley obtained a clutch of eggs in Sind, where it is a rare breeding straggler, "laid on bare rocky

ground, near Karachi, with no shelter of any kind," and another clutch taken near Kharagoda, in Cutch, was on similar ground. Eates also has obtained eggs in Sind in April from near the Habb.

The nest, as a rule, is a mere scratching in the ground and generally unlined. Davidson, Khan Nizam-oo-deen, who collected an immense series of eggs for Hume, Hume himself, Butler and many others never found a nest lined, but R. M. Adam, A. Anderson and one or two others speak of hollows being "scantily lined," or "lined," with scraps of grass or grass-stems.

In most places the scrape for the eggs is made in the open without shelter of any kind, but sometimes they are made under the protection of a clod or tuft of grass. Out of vast numbers examined the Khan found only two scrapes made under the shelter of the roots of tufts of grass. Adam also found a nest protected by the leaves of a bunch of Sarpat grass; Butler found them, some "on bare ground; others in grass banks, sometimes in the open, at other times under a tussock of grass."

When laid in the open the heat is often most intense, and one pities the poor bird on its eggs, which must, however, be covered, or the heat would destroy them. Cook refers to this, when he remarks:—"The Common Sand-Grouse lays its eggs in a hollow amid loose stones (I speak of the environs of Nowshera) in the months of May and June, usually on barren arid ground, the heat of which is terrible at that time of year. I have frequently found the eggs with the albumen semi-coagulated from the heat, and I fancy that if the bird left its eggs for any time during the heat of the day they would be baked."

This Sand-Grouse has also been watched wading, swimming and bathing in water, and St. Quintin records it giving its young drink in the same manner as already recorded under *P. a. caudacutus*, and doubtless this serves also to damp the eggs as much as necessary.

The breeding season lasts throughout the year, but I know of no actual record of an August egg. In the Southern half of its range more eggs are laid from January to April than in other months, while in the North most are laid between March and May.

The normal full clutch of eggs is three but, occasionally, two eggs only are laid. W. Blewitt once found five eggs in the same nest which he believed to belong to a pair. Khan Nizam-oo-deen also once found five eggs in one spot, but three were placed a couple of inches apart from the other two, and the five were the produce of two hens, as was doubtless the case in the five seen by Blewitt.

The ground-colour varies from very pale to rather darker grey, sometimes slightly tinged with yellowish, and the surface is covered equally all over with small irregular blotches, freckles and spots ranging from pale reddish-brown to a rather rich brown. The secondary marks are of pale grey, inky-grey or lavender and, in some eggs, these predominate and give the general tone to the egg.

In a few eggs the blotches are rather larger, bolder and more scanty, while I have one egg in which they form a broad definite ring at the smaller end. Taking the eggs as a whole they give one the impression of a grey-brown series, while those of the Painted Sand-Grouse appear to be a salmon-huff.

Two hundred eggs average 36.8×26.2 mm. : maxima 40.5×26.1 and 34.1×28.2 mm. ; minima 32.9×24.9 and 34.1×23.2 mm.

Incubation is said to take twenty days ; in other respects its habits are those of the family.

(1894) *Pterocles senegallus* Linn.

THE SPOTTED SAND-GROUSE.

Pterocles senegallus, Fauna B. I., Birds, 2nd ed. vol. v, p. 273.

This Sand-Grouse is found from Algeria, through North Africa and part of the Sahara, North and South Nubia and Egypt, Arabia and Mesopotamia, to Afghanistan, Baluchistan, the North-West Indian frontier and Sind.

In India it is a common resident bird in Sind and doubtless elsewhere on the North-West Baluchistan frontier. It occurs, not very uncommonly, in the Runn of Cutch and has also been recorded from Jamboghora, West of Ahmedabad ; from Poharan between Jesalpore and Jodhpore and from Shapur in the Punjab.

Mr. Percy Hyde, in writing to me, said he had seen flocks about 18 miles from Karachi, and the farthest East record seems to be a bird shot near Nagar in Jodhpore.

This Sand-Grouse probably breeds in some numbers in Sind if one could hit on exactly the right place at the right time. K. R. Eates, who has done exceptionally good field-work with the Sand-Grouse in Sind, tells me that the birds are so numerous that he is sure that *somewhere* they must breed in great numbers. The difficulties of transport etc. and the appalling heat make the search for their breeding grounds a most difficult matter. Eates had many heart-breaking journeys without result before one was attended finally with success, when in Khonju, in the Sakkur District, he at last came on nests, though even this he believes can only be an outlying post of some area where they breed in far greater numbers. With his usual generosity he has presented me with two clutches, one of three eggs and one of two, with which he supplies the following notes :—" I have ascertained that this Sand-Grouse breeds sparingly but regularly in Ubauro taluka, Sakkur District, and I have taken eggs at Goh-jo-pat and Khinja, a tract of more or less bare plain with a scattered thin growth of stunted ' kundi ' scrub and kandaro thorn. The nests consist of mere scratchings in the ground, unlined and unprotected in any way, right out in the bare plain."

Pearson obtained two clutches of three eggs each near Kotri in Sind during May. In addition to these, oviduct eggs, now in my

collection, were taken by Dr. G. C. McMullen near Kotri on the 24th April, 1907, and two more by Fletcher (Journ. Bomb. Nat. Hist. Soc. vol. xiii, p. 304, 1901) 14 miles North of Khargora, Sind. There was also another soft-shelled egg, unblowable, taken from a third female on the same date, the 19th February.

Pitman, Cox, Cheesman, Tomlinson and others took many eggs in Mesopotamia, and the first-named told me, *in epistola*, that "They are fairly common and breed round Kut and Sinn, though I was not lucky enough to find any clutch of eggs I could keep and clean. The birds seem to prefer the same bare ground for breeding purposes as that normally frequented by them at other seasons, and which is well away from human habitation. At the end of June I found a clutch of three eggs laid on the ground; there was no sign of any nest and the eggs were laid on the bare hard 'pat' (dried mud) of a dried up marsh. Unfortunately they were on the point of hatching, and it was quite impossible for me to clean them."

Cox and Cheesman took two clutches of three eggs each, one at "Aggur Qaf near Bagdad" on the 14th August and one "Near Bagdad" on the 25th July.

Single eggs were preserved out of hard-set clutches which were taken by Pitman on the 27th June and 3rd July, while Tomlinson in the Bussorah District also took eggs in June and Aharoni a single egg on the 15th May.

It seems, therefore, that in Mesopotamia they breed from early May to the end of August, while in India eggs have been taken from the 19th February (Fletcher) to the 16th May (Pearson and Eates).

In shape the eggs are typically cylindrical. In colour they are pale stone-buff or creamy *café-au-lait*, in one instance a rich cream and in another faintly greenish. They are marked all over with small blotches, spots and specks of pale rather reddish-brown and a few smaller spots of dark umber-brown. The secondary marks are fewer than the primary in most eggs and are of pale grey-brown or lavender. As a series the eggs give one an impression of dull grey-buff. Most eggs are dull and dully marked, only exceptional eggs being at all richly coloured.

Forty-six eggs average 40.9×28.4 mm. : maxima 48.5×28.0 and 41.8×30.2 mm. ; minima 36.2×23.1 and 38.1×26.6 mm.

(1896) *Syrrhaptes tibetanus* Gould.

THE TIBETAN SAND-GROUSE.

Syrrhaptes tibetanus, Fauna B. I., Birds, 2nd ed. vol. v, p. 277.

This grand Sand-Grouse is found within our limits in Ladak, Lahul and Sikkim, is very common in Tibet and extends North to the Pamirs and Koko Nor.

Ludlow in his paper on the birds of Gyantse- (Ibis, 1928, p. 216) says :—"I have never seen this bird below 14,000 feet in

summer, and have seen it only once near Gyantse, and that was in the depth of winter. At Tuna, Dochen, and Kala, and in other places in the vicinity of the lakes, it is often met with, and I have encountered it on the mountain slopes when in pursuit of Ammon, and watched it in the early morning fly down to drink on the shores of the Rham-tso. Mr. F. Williamson, I.C.S., on 19.6.25, whilst hunting for Ammon at Neru, obtained a clutch of three eggs which he very kindly presented to me. The eggs were laid in a shallow depression on the bare mountain side at an altitude of 15,000 feet. There was no attempt at a nest, and it was only by disturbing one of the parent birds that the eggs were discovered."

In Ladak Osmaston met with it near the Tso Moriri Lake, 15,000 feet, at the end of June, and on the 18th of that month found a pair of freshly hatched young in down.

From the time Steen was Agent in Gyantse I have had the eggs sent me almost yearly by him and his successors. These all describe the bird as being a frequenter of high desert plateaux which are very bleak, bare and stony, or of the country surrounding very high elevation lakes at 14,000 to 16,000 feet. Many eggs have been sent me as from Gyantse, but it seems that all these have been taken from the surrounding hills about 2,000 feet higher than the Gyantse Plain, which is only 12,000-12,500 feet. Some men whom I sent to the Hram-tso Lake to hunt for eggs of *Larus brunnicephalus* sent me eggs of this bird which they said they had found on the hard and caked mud environment of the lake and above where the Gulls usually bred.

Every one describes the nest as a scratching in among the small stones or earth with no lining except in one case, and the leaves and scraps then found were probably wind-blown. They were very seldom under shelter of any kind, but were usually built on the leeward side of a ridge or crest of a hill. The old birds sit very close, often not moving until almost trodden on.

The breeding season is principally May and June, but I have a clutch of three eggs taken above Gyantse on the 17th April and have seen another set taken on the 24th July.

In the last ten years I have been fortunate in obtaining eggs in some numbers from D. Macdonald and his son John, and have also managed to acquire from other collections clutches taken by L. Weir, R. S. Kennedy and others, so that I now have a fine series.

In shape the eggs are typical of the Sand-Grouse. In colour they are stone-grey or stone-buff, as a rule rather dull and pale but, occasionally, a little warmer and brighter and sometimes tinged with yellowish. The markings consist of small primary blotches and specks of reddish-brown, rarely yellow or sienna-brown, scattered sparsely more or less over the whole surface and seldom more numerous at the larger end than elsewhere. The underlying marks are larger and in colour are pale washed-out ink or grey. In two clutches of three eggs each the markings are rather larger and bolder

than usual, though still fewer in number, and are tinged with chestnut-brown.

Except for their greater size they are very like the eggs of Pallas's Sand-Grouse.

Forty eggs average 49.2×31.9 mm. : maxima 54.0×31.2 mm. and 48.5×34.6 mm. ; minima 44.0×29.0 mm.

Both sexes incubate but, beyond this, nothing more has been recorded except that they sit very close and will, if they think they have not been observed, sometimes allow passers-by to come very near.

Order VI. GALLINÆ.

(GALLINACEOUS BIRDS.)

Suborder ALECTOROPODES.

(PHEASANTS, PARTRIDGES and GROUSE.)

Family PHASIANIDÆ.

(PHEASANTS and PARTRIDGES.)

Subfamily PAVONINÆ.

(PEAFOWL.)

(1897) *Pavo cristatus* Linn.

THE COMMON PEAFOWL.

Pavo cristatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 282.

The Common Peafowl is found over nearly the whole of India and Ceylon with the exception of the Trans-Indus country in the North-West and the extreme North-East of India next to Burma. In some places, such as Sind, it is now common although not indigenous, but in the 24th Parganas, Nadia and adjoining districts of Eastern Bengal it is now extinct though once common and, even in the Santhal Parganas etc., is almost so. It does not occur over the greater part of the Sunderbunds, but I have seen it in Mymensingh and Barisal in the low-lying forest bordering the coastal and great tidal rivers. It is also found and is still common in many districts of Assam North and South of the Brahmapootra, though in the districts of Bengal East of the Bay its place is taken by the next bird, the Burmese Peafowl.

There can be no doubt that at one time the Peafowl everywhere was the forest-loving, secretive bird that it still is in those parts of India, such as the wilds of Assam, where it is not sacred and has, therefore, the same enemies, human and otherwise, that it has everywhere else.

At the present time there are many places where no man's hand can be raised against it and, in consequence, the birds have become almost domesticated and will breed in any patch of jungle, grove or cluster of bushes or hamboos close to, or almost inside, villages, while at other times they will breed in sugar-cane and other tall, thick crops.

In North Cachar, where it was common up to some 2,000 feet, as well as in the plains of the adjoining districts, its favourite breeding haunts were in very dense forest growing beside streams, and they specially affected those with a thick undergrowth of *Bér* bushes and thorny creepers. These bushes grow well apart, having little or no foliage for a couple of feet or so, above which they spread out into wide table-shaped tops which are almost impenetrable for man or big animals, yet easy for movement of Peafowl and small animals.

In North Cachar they also sometimes bred in pockets of caue, ekra and thick jungle lying in the hollows between the rolling grass and Oak-covered hills up to 3,000 feet. These pockets nearly always held water, stagnant or running, and water seems to be an absolute necessity for these very thirsty birds. Even when breeding practically in the open in cultivation etc. they still affect water, and Hume says: "canal-banks fringed with trees and traversing rich cultivation are their special delight." Marshall (G. F. L.) says much the same: "The Peafowl breeds during the rains in the Saharunpore, Bulandshahr and Aligurh districts, usually among the thick undergrowth on the canal-banks."

The nest is merely a scratching in the ground, sometimes unlined, occasionally well filled with grass, leaves and sticks, often merely wind-blown but, sometimes, apparently carried and placed therein by the birds themselves. If placed in jungle, such as the *Bér* bushes referred to above, little or no attempt at concealment is made but, as a rule, in the wilder forests and jungles it is built in tangles of briars, creepers or scrub which hide it.

Peafowl often breed in queer places. I once found a nest, from which the young had hatched, placed in a tangle of creepers and fallen rubbish on the top of a low bush, a few fragments of broken shell showing how it had once been occupied. Anderson once obtained three eggs of this Peafowl from an old nest of the White-backed Vulture, built in a tree in which Peafowl were in the habit of roosting. From Kashmir, again, Ward sent me two eggs taken from a Neophron's nest, one being that of a Peafowl and the other that of the Vulture, who was sitting on the two when taken.

Professor Littledale also records that when the country round

Baroda gets flooded the Peafowl resort to the big trees for nesting purposes, and he records the taking of three fresh eggs from a hollow formed by the great limbs of a Banyan-tree.

Over most of India the breeding season starts after the rains break in the middle of June and continues until September, but clutches of eggs may often be found in other months also. Both Hume and Adam took eggs in October, while Coltart took them in Bihar in April, and I have taken them in March and April in the hills of Assam. In the South of India they breed principally in April and May, but Miss Cockburn gives June and July as the breeding months in the Nilgiris. In Ceylon Legge says they breed from January to April, but Wait says that they lay after the North-East Monsoon has begun.

I think four to six eggs is the normal clutch; Hume says up to eight and that he has never seen more. Miss Cockburn certainly says that in the Nilgiris they lay ten to fifteen, but this is not the experience of any of the great number of ornithologists who have worked there since her time. Three eggs only are often incubated.

The eggs are (*vide* Hume) "typical rasorial ones, with thick, very strong and glossy shells, closely pitted over their whole surface with minute pores." In shape they are very broad, blunt ovals, but sometimes curiously pointed ones may be seen.

The colour varies from a very pale cream or *café-au-lait* to a decided buff or cream. Occasionally eggs are flecked, sparingly or plentifully, with a darker buff or buff-brown, while I have seen one curious egg mottled all over with grey as if mildewed.

One hundred eggs average 69.7×52.1 mm. : maxima 76.2×54.1 and 73.4×58.9 mm. ; minima 61.2×43.1 mm.

(1898) *Pavo muticus* Linn.

THE BURMESE PEAFOWL.

Pavo muticus, Fauna B. I., Birds, 2nd ed. vol. v, p. 284.

This very handsome Peafowl is found over the whole of Burma, Siam, Cochin China, the Malay States, Java and possibly Sumatra. To the North it occurs, though it is rare, in the Lushai Hills and Chittagong Hill Tracts. It formerly ranged to Manipur, but appears now to be extinct. There are a few birds in the North Cachar Hills, but these are said to be the descendants of imported birds, though it is possible they are a remnant of the birds which once inhabited these and the adjoining district of Manipur.

The breeding habits of this species differ in no way from those of the really feral examples of the preceding bird. It breeds either in forest, and that of the most dense, or, very occasionally, in thick, long grass and reeds, or in bamboo-jungle. One nest from which three eggs were taken on the 21st May in North Cachar was in a

very thick tangle of thorny bushes almost impossible to get through. The nest was a large scratching in the earth about 2 feet across and nearly 6 inches deep in the centre, but filled with a mass of reed-blades, grass and leaves, the whole being screened by the big buttresses of a huge Cotton-tree, between which it was placed.

Gairdner and Keddle found numerous nests in Siam and, among others, the latter records half incubated eggs on the 9th April and chickens a fortnight old on the 18th March.

Mackenzie, Hopwood, Cook and others also took numerous nests in many parts of Burma and state the bird is extraordinarily common on some of the rivers.

Blanford recorded the breeding season in Moulmein as being from June to September but in Pegu as about March. Since his time we have learnt much more about this Peafowl, and now know that practically over the whole of its area January to the end of April forms the chief breeding season, though a few birds may breed after the rains start in July to September, perhaps second broods.

The number of eggs laid is three to six and I have no record of any bigger clutch.

They cannot of course be distinguished from those of the Indian species, but pointed eggs are more common.

Thirty-six eggs average 72.7×53.5 mm. : maxima 80.0×54.4 and 75.6×55.2 mm. ; minima 67.4×51.0 mm.

Subfamily ARGUSIANINÆ.

(ARGUS and POLYPLECTRON PHEASANTS.)

(1899) *Argusianus argus* (Linn.).

THE ARGUS PHEASANT.

Argusianus argus, Fauna B. I., Birds, 2nd ed. vol. v, p. 286.

This remarkable Pheasant is a resident in the Malay States, the South of Tenasserim and Siam in the North, and Sumatra in the South.

To quote Davison on this bird's habits :—" They haunt exclusively the depths of the evergreen forest and each male chooses some open level spot, sometimes down in a dark gloomy ravine, entirely surrounded and shut in by dense cane-brakes and rank vegetation."

Hardly anything is known about its breeding. Davison writes :—" I was unable to find the nest, but from what I could learn, the female builds a rude nest on the ground in some dense cane-brake, laying seven or eight eggs, minutely speckled with brown like a Turkey's, and hatching and rearing her brood without any assistance or interference from the male. They are said to have no regular breeding season, the females laying at all times except the height

of the rains. I secured two nestlings about a week old on the 28th February."

Oates describes two eggs laid in captivity as "pale reddish buff, freckled with pale reddish brown. In one specimen the freckles are coarse and distributed all over the shell, in the other they are minute and clustered round the two ends."

In my own collection I have two eggs collected by natives for Waterstradt, then bought by Kuschel, who gave them to Dr. Coltart and myself. Of these two eggs, both the production of wild birds, one is a *very* pale *café-au-lait*, so minutely freckled or stippled with a darker shade as to appear unicoloured, while the other is a pale clear cream, almost white. A third egg, laid by a captured bird and given to me by Kloss, is exactly like the second of the Waterstradt eggs.

Oates's two eggs measured 2.55×1.85 inches and 2.6×1.9 inches ($=64.8 \times 46.0$ and 66.0×48.2 mm.).

The three in my collection measure 66.9×42.8 , 68.0×46.3 and 61.3×44.0 mm.

It is not known how many eggs are laid, but Davison's estimate of seven or eight seems excessive. He saw two nestlings only, and birds in captivity have not been known to lay more than two, so it seems possible that, as with the *Polyplectrons*, only two eggs are laid.

***Polyplectron bicalcaratum*.**

THE PEACOCK-PHEASANT.

(1900) *Polyplectron bicalcaratum bicalcaratum* (Linn.).

THE BURMESE PEACOCK-PHEASANT.

Polyplectron bicalcaratum bicalcaratum, Fauna B. I., Birds, 2nd ed. vol. v, p. 289.

Lowe defines the area of this Peacock-Pheasant as "Chittagong, Chin and Kachin Hills, South to Tenasserim, East to Siam."

The habits and nidification of this race differ in no way, so far as is known at present, from those of the next bird, of which a full account is given, principally from my own experience.

I have very few eggs of this race; it is very common in the Chin Hills and, indeed, in the lower ranges of nearly all the Burmese hills, but the nest and eggs seem to have escaped the close search of numerous collectors. P. C. Cook obtained two eggs in the Kachin Hills on the 14th April; Macdonald took two others in the Chin Hills on the 22nd April and, finally, Partridge junior collected two for me, together with the bird, on the 3rd March; but one of these last eggs was broken by the struggles of the hen when snared.

This would seem to show that the normal clutch is two only, and the eggs are exactly like those of the Bhutan and Assam race.

My five eggs average 47.5×37.5 mm. and vary between 45.4×37.0 and 50.9×38.3 mm.

(1901) *Polyplectron bicalcaratum bakeri* Lowe.

THE BHUTAN PEACOCK-PHEASANT.

Polyplectron bicalcaratum bakeri, Fauna B. I., Birds, 2nd ed. vol. v, p. 291.

This race was named by Lowe from Bhutan, and it extends West into Sikkim and East into Assam, Cachar, Sylhet and Manipur.

All the birds of this genus are skulkers in forest of some kind, both in the plains and in the foot-hills up to some 2,000 feet and, as stragglers only, up to 6,000. They are most common in thick cover along the banks of streams and are equally partial to dense evergreen forest, tangled scrub and secondary growth in deserted cultivation or thick scrub and bamboo mixed. Perhaps their favourite haunt is the matted undergrowth and thin small-tree forest found in the third and fourth year after a hill rice-field has been left uncultivated. The mixed grass, weed and bush in these places often grow so close together that it is difficult to force a way through and quite impossible to do so quietly. They are also fond of ravines in very broken country in which outcrops of rock and a thick growth of low bushes are found between the great trees of virgin forest. Wherever they may breed water will not be far off; this may be a wide stream, a trickling brooklet down the hillside or a pool of water but, if the latter, this will be pure and clean and not dirty stagnant water.

The nest is almost invariably exceptionally well hidden, and one generally finds it by noticing the bird sneaking away and then hunting round a few yards back from where first spotted. Coltart's and my experience of the nests, and we have both seen dozens, is that they are very primitive. Often there is no scratching or natural hollow, the eggs being dumped on a few dead leaves collected together or even laid on the débris as it has fallen. Sometimes the birds scratch out hollows and fill them in with leaves and débris, but this is the best we have seen. Hume, however, in 'Game-Birds,' quotes Clarke as describing a nest of this Pheasant which was "made of twigs and leaves roughly put together, with an apology of a lining of the bird's own feathers, and possessed sufficient cohesion to permit of its removal, eggs and all, to my bungalow."

The breeding season is quite well defined. Most birds lay in April and May, though I have taken a good many eggs in the latter half of March and in June.

The normal full clutch of eggs is two, and an examination of the ovaries of many breeding birds show two to be the number generally laid. At the same time I have taken several threes and fours and one or two fives, while Coltart found a clutch of six. This latter, like several of the bigger clutches taken by myself, was obtained in circumstances which would seem to prove that they were laid by one and the same bird. On one occasion when camping in some

rice-clearings on a hillside we were examining a patch of ground, too broken to allow of being cultivated, in which we had heard the chuckling of this bird and hoped to find the nest. After half an hour's search one of the Nagas, who was helping me, found the nest in a bed of weeds and nettles, containing five eggs. Leading to the nest was a tunnel well worn by the birds' frequent entrance and exit. In this we set some nooses and then retired and, within half an hour, the Pheasant returned to her nest and was caught. The patch of jungle was not big and was surrounded by open rice-fields so, when we beat the ravines, nothing could escape unseen, yet we could put up nothing more than a couple of Bustard-Quail. It would appear most unlikely that three hens could have found this isolated nest and all have laid in it. Coltart also was fully convinced that his six eggs were all laid by one and the same bird.

The eggs are just like the eggs of any one of the Kalij Pheasants—that is to say, they range from a pale cream to a rich chocolate-buff, being most often a warm cream-buff. Unlike the Kalij eggs, however, they are nearly always more or less stippled all over with specks, small blotches and spots of white in some cases of a chalky white, but often looking merely as if wanting the pigment laid on elsewhere.

The texture is very hard and fine and the surface glossy, while in shape the eggs are broad ovals, very little pointed at the smaller end and rather broader in proportion than Kalij eggs.

Forty eggs average 46.5×35.9 mm.: maxima 50.3×37.0 and 48.2×38.1 mm.; minima 43.2×35.0 and 44.0×34.0 mm.

The male is monogamous and keeps close to the hen when sitting, but I do not think he assists in incubation.

When the chicks are hatched and begin to run about they generally keep close behind and *under the tail* of the female, who spreads it like a fan and holds it over them.

Pocock (Avicultural Mag., vol. ii, pp. 229–237, 1911) has given a good account of the display of this beautiful bird in captivity which agrees well with what I have seen performed by wild birds. On one occasion I was lying on the ground by a tiny forest-stream, which rippled and fell in pigmy cascades over boulders and mossy banks in deep forest, when a pair of these Pheasants came out of the dense undergrowth into a small open space in front of me. For a few minutes both just scratched round for grubs and insects, and then suddenly the cock began to display. At first he merely ran round the female with tail raised and partly extended and both wings drooping and spread out; in a few minutes he stopped and sank slowly to the ground until his breast rested on it. His tail and wings were then raised until the three formed a widespread upright fan, the tips of the secondaries meeting over and in front of the tail whilst the head was buried in the soft breast-feathers. As soon as the hen moved the head was partly thrust out. For some time the female paid no attention and continued to feed, but

shortly she too became excited and did a little posturing and wing-spreading on her own account, but never gave a full display like that of the cock bird, and almost immediately copulation took place.

(1902) *Polyplectron malaccensis* Scop.

THE MALAY PEACOCK-PHEASANT.

Polyplectron malaccensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 292.

Within our limits this Pheasant only occurs in the extreme South of Tenasserim, whence it extends to the Malay States and Sumatra and to Pechaburi and Ratburi in South-West Siam.

Its habits and nidification are those of the genus.

The only three eggs I have seen of this bird are two laid in captivity in Berlin in April and one of a pair sent me with a skin of a female shot off the nest which contained two eggs, one being broken in transit. These three eggs measure 45.7×35.3 , 49.5×32.0 and 43.4×34.9 mm. The second is probably abnormally large.

Subfamily PHASIANINÆ.

(TRUE PHEASANTS and JUNGLE-FOWL.)

Gallus bankiva *.

THE RED JUNGLE-FOWL.

(1903) *Gallus bankiva murghi* Rob. & Kloss.

THE INDIAN RED JUNGLE-FOWL.

Gallus bankiva murghi, Fauna B. I., Birds, 2nd ed. vol. v, p. 295.

The Red Jungle-fowl is found in the Lower Himalayas from Kashmir to East and South Assam; North and East Central Provinces, Western Bengal, Chota Nagpur, Bihar and Orissa; Mundla, Raipur, Bastar and South to the Godavery. As Hume and others have pointed out, the range of the Jungle-fowl coincides almost exactly with that of the Sâl-tree (*Shorea robusta*) and the habitat of the Swamp-deer (*Cervus duvauceli*).

Our Jungle-fowl is, as its name infers, a bird of the forest and jungle, but it really does not much matter what kind of jungle it is. Probably it prefers fairly dense jungle with cultivation round about,

* I see no reason to depart from the nomenclature used in the 'Fauna.' It is quite impossible to use *gallus*, which Linnaeus applied to a domestic form, not the Red Jungle-fowl, which he described with the adjective *pugnax*.

so that it can breed in the former and feed in the latter. In the hills, where it is common up to 5,000 feet and occurs up to at least 7,000 feet, I think we found most nests in forest with undergrowth on the borders of the rice-fields, but many also bred in bamboo-jungle or in secondary growth. Others again made their nests in bush and tree-forest on islands in the bigger streams while, like nearly all Game-birds, they prefer sites which are close to water.

The nests are just scrapes in the ground, but these are nearly always well filled with grass, leaves and other rubbish, sometimes as it falls but, more often, scraped together by the birds. Occasionally no scrape is made and the eggs are deposited on whatever débris lies about.

Three nests out of four are well hidden under bushes, ferns, long grass or brambles but, when in bamboo-jungle, they may be right out in the open, though the buff eggs hardly show at all on the fallen bamboo-leaves and may be passed very close without attracting attention.

They breed from the end of March to the end of May, but odd clutches may be taken from January to October.

So far as my own experience goes five to seven eggs generally form the full clutch; eight, nine or ten are sometimes laid but, on the other hand, I have seen three or four only incubated. Hume says five or six is the usual clutch, Hutton says that in the Dhun it is four to six, but Jerdon says eight to twelve eggs.

The eggs are like small eggs of the domestic fowl and vary from very pale buff, cream or fawn to a colour as deep and rich as that of the darkest egg of a barn-door fowl. I have not, however, ever seen a clutch of really white eggs.

In shape and texture, as well as in colour, they are also similar to eggs of the domestic bird and vary to the same extent.

One hundred and fifty eggs average 45.3×34.4 mm.: maxima 52.0×35.5 and 46.3×41.1 mm.; minima 39.6×33.2 and 44.0×32.0 mm.

I have no doubt that most cock birds are monogamous and take quite a keen interest in the feeding and protection of the young, though they certainly take no part either in incubation or in the preparation of the nest.

The display needs no description, as it consists in the same running round the hen, the same stiff distention of the wing and the accompanying brushing of the ground that is indulged in in our home farms. There is one feature, however, that is not seen or, rather, heard at home, and that is the drumming sound made by the cocks when perching, which is produced by the rapid beating of the wings against the body.

The period of incubation is twenty days.

(1904) *Gallus bankiva robinsoni* Rothschild.

THE BURMESE JUNGLE-FOWL.

Gallus bankiva robinsoni, Fauna B. I., Birds, 2nd ed. vol. v, p. 298.

This Jungle-fowl is found throughout Burma, Yunnan, Siam, Cochin China, Annam and the Malay Peninsula to Sumatra.

There is little one can add to the description of the preceding bird's nidification, which in every way agrees with that of this bird.

Sometimes, when bamboos are seeding, these Jungle-fowl breed in immense numbers in a comparatively confined space. MacKenzie, in a letter to me dated 22. 12. 1917 from Southern Burma, writes :—" Also I have an extraordinary number of Burmese Jungle-fowl eggs. One 13 clutch found together with either 6 or 7 *Gennæus lineatus* eggs all in one nest, two or three clutches of 9, 10 and 11 while the rest were 7 and 8. I found 40 or 50 clutches of 8. When the bamboo was flowering in Pegu and the Jungle-fowl were very numerous I could have shot 50 a day just walking about. All the birds from Tharawaddy, Prome and Myoungbhin came into Pegu to feed on the bamboo-seed, as the bamboo in these districts had flowered a year or two previously and food was consequently scarce in them. I should think the average number of eggs in a clutch was at least 10 but I, unfortunately, did not make many notes. I found about 20 nests in a teak-plantation which I went carefully over while at work with about 20 coolies. The area was one of about 160 to 170 acres, but cover was very thick as bamboos had been felled in order to give the young teak-trees room."

The usual clutch in normal years is four to six and the eggs are just like those of other races.

Sixty eggs average 43.2×33.9 mm. : maxima 47.0×34.2 and 43.5×36.0 mm. ; minima 38.3×32.5 and 39.4×31.0 mm.

(1905) *Gallus sonneratii* Temm.

THE GREY JUNGLE-FOWL.

Gallus sonneratii, Fauna B. I., Birds, 2nd ed. vol. v, p. 298.

The Grey Jungle-fowl is distributed throughout the greater part of Southern India from nearly the extreme South of Travancore as far North as Mt. Abu on the West and the Godavery on the East. It is common in parts of the Deccan and Central Provinces.

Like all Jungle-fowl, it is a forest-bird and is found in the broken plains country and in the hills up to the summits of the Nilgiris and other hill-ranges of the South.

So far as the haunts of this bird are concerned and the manner of its nidification they closely resemble those of the Red Jungle-fowl,

but they seem sometimes to make a rather better nest, for it is said occasionally to consist of a mass of sticks, bamboo spathes, leaves etc. matted into a compact and solid pile, with a hollow in the centre for the eggs.

The breeding season extends over February to May, and Davison also found them breeding in the Western Nilgiris in October, November and December. In the Nelliampathy Hills Kinloch found eggs from February to October, while in Travancore Stewart and Bourdillon took them from March to July. In Poona they breed more or less throughout the year, but principally in March and April.

The normal clutch is undoubtedly three to five eggs. Stewart, who saw a very large number of nests, sent me one clutch of seven as something most unusual, and says four or five is normal. Kinloch found three eggs most often, though once he obtained ten eggs from a nest, possibly the produce of two females. Davidson in Khandesh never found more than four.

On the other hand, many observers talk of much larger clutches. Miss Cockburn leads the way with "seven to thirteen"; Davison "6 to 10"; Jerdon 7 to 10. Probably all these estimates are made from native statements and are not worthy of much credence.

The eggs are like all other fowls' eggs, but it is not very unusual to find on the surface a few dark freckles of light brown, dark brown or reddish-brown. Such markings are exceptional, more numerous than they are in the eggs of the Red Jungle-fowl, but much less so than they are among the eggs of the Ceylon Jungle-fowl.

Sixty eggs average 46.3×36.5 mm.: maxima 51.0×36.1 and 49.0×38.0 mm.; minima 43.0×34.3 and 40.1×33.1 mm.

(1906) *Gallus lafayetii* Lesson.

THE CEYLON JUNGLE-FOWL.

Gallus lafayetii, Fauna B. I., Birds, 2nd ed. vol. v, p. 300.

Ceylon only is inhabited by this Jungle-fowl and it occurs there, according to Wait ('Birds of Ceylon,' 2nd ed. p. 317, 1925), "in most parts of the island except in the more cultivated districts. Its chief haunts are the forests of the north and the scrub-jungle of the maritime districts. It ascends in great numbers to the Horton Plains and other elevated plateaus when the *nella* (*Strobilanthus* sp.) is ripe." Legge says that "in the hills it is resident and breeds commonly up to 6,000 feet."

The Ceylon Jungle-fowl, like others of the genus, keeps closely to the thickest of jungle when breeding.

In many cases, perhaps in the majority, this Jungle-fowl makes its nest on the ground in some hollow, lined with leaves and well hidden in the undergrowth. Legge writes ('Birds of Ceylon,'

vol. iii, p. 336) :—" The nest is nearly always placed on the ground near a tree, under a bush, or beneath the shelter of a fallen log ; a hollow is scratched and a few dry leaves placed in it for the eggs to repose upon. I once found a nest in damp soil between the large projecting flange-like roots of the Doon-tree containing two eggs partially incubated.

" In 1873 Mr. Parker found a nest on the top of a young tree about 30 feet high. He writes to me that it had the appearance of a Crow's or Hawk's nest, of which the Jungle-hen had taken possession. She flew off and three eggs were found to be in the nest."

This curious habit of making its nest at some height from the ground seems to be a characteristic of this Jungle-fowl. W. A. T. Kellow and Jenkins both told me that they constantly found eggs laid in nests on stumps, tops of bushes etc. Wait writes :—" In one respect I differ from Legge's account of the nesting of the Ceylon Jungle-fowl, for this bird's nest is quite as often built on the ground as off it. The most peculiar situation I have come across was in an oven-shaped hollow about 8 feet from the ground in a fairly large tree which stood at the edge of a cart-track running through the jungle. A big branch had been torn off at its junction with the stem of the tree, and the socket had rotted out. In the hollow thus formed four eggs had been laid on a soft layer of touch-wood which had crumbled to dust. On another occasion I came across a nest in a hush overhanging a dry water-course. It was a mere depression in a matted platform of dead leaves which had been swept down the water-course in some flood.

" A favourite site is a stump of a tree which has been felled and left standing after the tree has been taken away. In these cases there is a scanty bed of dead leaves which have fallen from the surrounding trees and collected in the hollow which generally forms in the upper surface of the stump in a very short time."

Layard, Parker and Hart all refer to this habit of laying on old stumps, and the natives are also well aware of it.

Eggs may be taken in any month of the year, and Wait has taken them or seen them in every one. In the higher hills the months of March to June are the favourite ones for laying, but even here they may be found at almost any time.

The number of eggs laid varies from two to four, and the latter is so rare that I did not succeed in getting a clutch of four until 1931, when Phillips obtained and sent me one. The large clutches, one of nine, obtained by Beehe, were probably arranged for him, as no such clutch is ever laid normally, nor would it be possible for birds selecting sites on stumps and other places high up to have room in them for large clutches.

The eggs are very curious ; in shape, texture and ground-colour they are quite typical *Gallus* eggs, but the great majority are marked. Most eggs have a minute stippling of specks and spots of light brown, purple-brown or purple-grey all over the surface, with a

few scattered small blotches of the same. Some eggs, however, are quite well marked with small blotches of brown of some shade and with larger, well-marked secondary blotches of iron-grey or ink grey. A few eggs have only these dark grey secondary markings, which give them a very quaint appearance. One egg taken by Wait is quite handsome, with large red smoky blotches on a pale stone ground.

Forty-eight eggs average 46.3×34.5 mm. : maxima 49.5×39.8 mm.; minima 42.1×35.0 and 43.1×32.0 mm.

Syrmaticus humiæ.

THE BARRED-BACK PHEASANT.

(1907) **Syrmaticus humiæ humiæ** (Hume).

THE MANIPUR BARRED-BACK, OR MRS. HUME'S, PHEASANT.

Syrmaticus humiæ humiæ, Fauna B. I., Birds, 2nd ed. vol. v, p. 303.

The range of this beautiful Pheasant is Manipur, whence it was described, Patkoi Naga Hills, Lushai Hills and Northern Burmese hills, West of the Irrawaddy, South to Haka in the Chin Hills, where it occurs at all elevations between 4,000 and 10,000 feet. They frequent and breed in thin forest or forest mixed with open spaces of grass and bracken. They also frequent, but have not been recorded as breeding in, open grass-land. Wherever found, however, the country is broken and rugged, and the birds seem to prefer, especially for nesting purposes, steep and rocky hillsides, broken by ravines and outcrops of rock.

They have been found breeding from 6,000 feet upwards, but very little is known about their nidification, although a large number of nests have been obtained through native collectors.

Mackenzie, Hopwood, Wickham and Blandy (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 288, 1929) all had clutches of eggs brought to them by Chins, and in some instances examined the places where they had been laid. Mackenzie writes (*ibid.* vol. xxv, p. 91, 1917):—"Eggs with a skin. The eggs are of the ordinary *Phasianus* type; three clutches were obtained, all from about 6,500 feet. The bird seems to breed near the top of the main ridge. 8 eggs obtained on the 1st May, 1914, hard-set; 7 eggs on 1st May, 1914, hard-set; 10 eggs on 1st May, 1915, hard-set. Average size of 15 eggs $1.85'' \times 1.37''$; length from $1.99''$ to $1.78''$; and breadth $1.31''$ to $1.40''$."

Odd eggs were again taken by Mackenzie and Hopwood on 20. 5. 18 and sent to me.

Finally, Livesey personally took three fresh eggs at Vanna, near Haka, on the 27th May, 1930.

All those who have seen the sites say that the eggs were laid on the ground either just on the top of the fallen leaves and débris, or in a hollow scratched out by the birds and full of the same leaves etc. The nests, if one may call them so, were in most cases very exposed, although not conspicuous, as the eggs matched the fallen leaves, but one or two were apparently well hidden. Those found by Blandy "were found at the foot of a tree on a dwarf-oak-covered spur and the nest was hidden in a small bush (about 1 foot high) of undergrowth. The nest was a simple excavation in the ground lined with oak-leaves."

They appear generally to lay their eggs on the top of ridges and spurs, just below the crest on the leeward side.

All the eggs obtained so far have been found in April and May, and the clutches have numbered six to ten and, as these were all hard-set, they must be accepted as full clutches.

The eggs are not in the least like the eggs of *Phasianus colchicus* and its relations but are like small *Gennæus* eggs. In shape they are broad blunt ovals, the texture fine and smooth, not pitted, but satiny to the touch. In colour they are a pale dull creamy buff, very rarely with a pinkish tinge.

Forty-three eggs (these include all Mackenzie's and Hopwood's measurements of unblown eggs) average 48.7×35.3 mm.: maxima 51.5×36.3 and 46.2×37.8 mm.; minima 46.0×33.7 and 48.5×33.2 mm.

(1910) *Catreus wallichii* Hardw.

THE CHEER PHEASANT.

Catreus wallichii, Fauna B. I., Birds, 2nd ed. vol. v, p. 307.

The Cheer Pheasant is found from the North-West Frontier to Nepal and possibly into the extreme West of Sikkim, as in 1894 some live birds were brought into the Darjiling bazaar for sale, and I got the skin of a female which had laid an egg *en route*. In some parts of Kashmir it is quite common, as it also is in the lower Himalayas from Kumaon to Garhwal. Col. H. L. Haughton obtained specimens at Karna and Darwa (Kashmir) and also at Kaji Nag and Pir Panjal.

The Cheer, one of our finest sporting birds in India, keeps much to very rugged country, heavily forested and with much undergrowth, at all elevations between 5,000 and 9,000 feet, but almost always between 6,000 and 8,000.

In Hume's time very few nests had been found. Hume himself had taken three clutches, and "Mountaineer" (Wilson) had taken others. Since then a good many observers and sportsmen have seen their nests but, as the Cheer is rigorously—and rightly—protected, very few eggs are taken. Whympers found them breeding in Garhwal round about 7,000 feet in May, while Osmaston (B. B.) took a clutch of eight eggs at Chakrata on the 3rd June at 8,000 feet.

Hume's description of the three nests he took is very typical of all those of which I have record. He writes ('Nests and Eggs,' vol. iii, p. 412) :—"Personally I have only taken three nests of this species altogether, so that I cannot generalize safely"; but my impression, derived from my limited experience, is that they always nest near or at the foot of some very precipitous hill-side, what the natives call 'Danj' cliffs, not absolutely vertical, but still the next thing to it, broken into ledges and steps, and studded with down-trailing bushes, tufts of grass and, growing here and there out of some larger cleft or wider ledge, a few stunted trees.

"In a precipice such as this on the 3rd May I found a nest of the Cheer containing two eggs. It was a mere depression, about 14 inches in diameter and three inches in depth in the centre, obviously scratched by the birds and strewed, rather than lined, with a few scraps of grass. Eleven more eggs were laid and then the bird began to sit. One egg was added, the rest were hatched somewhere about the beginning of June."

Osmaston's description of its haunts (Journ. Bomh. Nat. Hist. Soc. vol. xxviii, p. 158, 1921) in Garhwal differs a little from Hume's : "In Garhwal it is seldom found in any numbers; its favourite haunts being steep grassy slopes from 5000' to 8000' elevation." Of a clutch of eggs which he sent to me he writes :—"Nest in long dry grass in open glade in Deodar forest on a fairly steep slope." It is probable, I think, that in the breeding season this Pheasant keeps to much denser forest and to more precipitous country than it does at other times. Whistler also says that at Kulu (*ibid.* vol. xxxi, p. 482, 1926) it is found "on open dry grassy slopes among scattered cheel trees."

In its lower habitat eggs may be taken from the end of April to May but, in the higher ranges, few birds lay before the first week in May and some as late as early June.

The full clutch varies considerably. Adam says they lay from nine to twelve, Wilson nine to fourteen, Hume found thirteen and one with "several"; Whympers and Osmaston both took clutches of eight. Probably eight to ten form the most usual clutch.

In colour the eggs vary from pale dull creamy white to a pale, dull grey-buff, always very pale and dull looking. In almost every egg there are a certain number of freckles or small irregular blotches of light reddish-brown and, in the eggs in my own collection, these are generally at the smaller end, while the same unusual disposition occurs in the eggs of this Pheasant in the British Museum and Tring collections.

The texture, for a Game-bird's egg, is fairly fine, hard, close and slightly glossy. The shape is oval, not peg-top like *Phasianus* eggs.

Forty-eight eggs average 53.4×39.3 mm. : maxima 56.2×40.1 and 56.0×40.6 mm. ; minima 49.9×38.2 and 54.0×36.8 mm.

The Cheer Pheasant is monogamous. Wilson recorded that "both male and female keep with the young brood and seem very solicitous for their welfare." Again, Mr. A. Wimbush, of the Indian Forests, writes to me in a letter :—"At about 8,000 feet I came suddenly upon a pair of Cheer Pheasants with a brood of chicks about one or two days old.

"The parent birds, which appeared to have been sitting touching one another, as though each covering half the chicks, waited until I was 10 or 12 yards away and then started a most lively demonstration.

"The chicks ran in all directions, one coming straight towards me, and the two old birds, with tails spread, wings arched and neck-feathers ruffled, ran backwards and forwards in front of me, clucking just like an old hen."

Finn also notes of the display: "A vicious male in the Calcutta Zoo used to show off in the Common Pheasants' attitude, aslant with spread tail when trying to attack and, as the show position so commonly seems to be the fighting one also, I expect this species displays in the same way when courting."

***Puerasia macrolopha* *.**

THE PUCRAS, or KOKLAS, PHEASANT.

(1911) ***Puerasia macrolopha macrolopha* Less.**

THE ALMORA KOKLAS PHEASANT.

Puerasia macrolopha macrolopha, Fauna B. I., Birds, 2nd ed. vol. v, p. 310.

The range of the typical form of Koklas stretches along the Outer Himalayas from Kuman to the Simla States and Garhwal and North to Lahul. Birds of Jammu, Kashmir, are also nearest this race. The boundary lines probably are the Jhelum River on the North-West and the Chenab where it runs East and West.

The Pheasants of this genus are forest-birds breeding between 6,000 feet and the forest's limits, about 12,000 feet and, casnally, some 2,000 feet higher. Rarely also they may be found breeding down to about 4,500 feet.

In my 'Indian Pheasants,' p. 209, I give a full account, to which I can add nothing, of its breeding haunts :—

"Ratray has a beautiful photograph of this Pheasant's nest taken by him near Murree, and he records it as breeding very commonly in the Galis in the vicinity of that place between 7,000 and 9,000 feet. In letters to me he describes the nest as being

* It has been shown that *Cerionis macrolopha* Lesson = *Melcagris satyra* Linn. So we may revert to *Puerasia* for the generic name of this Pheasant.

nearly always placed in thick green undergrowth on the sides of hills in forest, either evergreen or fir. Sometimes it is in among the bracken and sometimes in among tangles of briars, raspberries or other canes but, wherever placed, generally well hidden from view and, often, protected by a fallen tree or some densely foliated low bush. Occasionally the nest is wedged in among the projecting roots of some big tree, either standing or fallen, and, in such cases, may be in a hole or hollow out of sight. Rattray also observes of the nests he saw round about Murree and in the Galis that everyone was placed under thick bushes of a species of rue with a strong aromatic smell."

The nest itself is a poor affair of sticks, leaves, grass and dead weeds, more often than not merely the fallen odds and ends with a receptacle for the eggs scratched out in the centre. Less often it is a rather more pretentious affair, a hollow having been scratched out by the birds, well filled in with material as above and then a depression, deep or shallow, worked out for the eggs.

The nest may often be found in forests of the Paludna Pines, and when in these it is usually in some damp, mossy ravine, in which the rocks, bracken and bush undergrowth offer better protection and concealment than do the more open parts under the pines, where the undergrowth is scanty and the surface of the hill-side unbroken.

Dodsworth found it breeding near Simla among Deodars in the same kind of positions as those found in the Paludna Pine country and, generally speaking, thick undergrowth for the nest to be hidden in and the near vicinity of water seem to be the two great essentials for a breeding haant.

The breeding season is late. In its lowest elevations a few birds breed in April but, higher up, most birds lay from the middle of May to the end of June.

The full clutch of eggs is probably five to seven. Rattray and Wilson both give seven as the normal full clutch, Hume says five to nine; Whymper has taken seven, but thinks that more often five or six only are laid. The biggest clutch taken by Osmaston is eight, while I have had several clutches of four or five eggs sent to me said to have been hard-set.

In general appearance the eggs rather remind one of sparsely marked Grouse-eggs. The ground varies from a pale yellow-stone or pale buff to a deep buff, sometimes rather rich and deep and, very rarely, with a distinct pink tinge. The markings consist of spots, specks and blotches of reddish-brown, dark, pale or medium in different clutches and, occasionally, with a purplish or chocolate tinge. In the majority of eggs the markings are small, a few blotches but, principally, specks and dots, scattered thinly and irregularly over the whole surface. In a few eggs the markings are rather larger and even more scarce, while in one clutch, taken by Whymper, they consist of scanty but bold blotches of purple-brown, the surface of the spots looking as if mildewed.

There are no real secondary marks, but a few blotches may be paler than the rest and tinted yellowish or sienna.

In shape they are fairly true ovals and in texture similar to those of the Cheer, but brighter and cleaner looking.

Sixty-eight eggs average 51.3×37.5 mm.; maxima 57.0×38.1 and 51.0×40.0 mm.; minima 49.0×37 and 51.1×34.5 mm.

The Koklas is monogamous and pairs for life. Hume considered this to be the case, and says that the cock-bird may generally be found close to where the hen is sitting and that he shares with the hen the duty of looking after and feeding the chicks.

"Pine Martin," however (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 797, 1910), disagrees with this, and says: "In the shooting season the old cocks are almost always found by themselves. In shooting, if your dog puts up an old cock, do not trouble to look for any more birds near him."

The hen sits very close, but generally sneaks away very quietly before being spotted.

Incubation takes twenty to twenty-one days, and the chicks are able to fly well within a very few days after they have been hatched.

(1912) *Pucrasia macrolopha biddulphi* Marshall.

THE KASHMIR KOKLAS PHEASANT.

Pucrasia macrolopha biddulphi, Fauna B. I., Birds, 2nd ed. vol. v, p. 312.

This race is found over the whole of Kashmir, excluding Jammu, from the extreme North-Western Frontier to Ladak. Where the Indus runs North and South it probably forms the Western boundary, but North it occurs in Gilgit and Ladak North of the Indus, where it runs East and West.

As regards its breeding habits there is nothing to remark on in addition to what has been recorded about the typical form.

Ward has on several occasions taken its nest between 7,000 and 10,000 feet, and Davidson recorded it as common above Gund, though he failed to find any nests. Livesey also obtained nests in Kashmir.

The breeding season is May and June, though Ward took one hard-set clutch of six eggs on the 15th July.

The number of eggs laid is sure to be about the same as is laid by the typical form, but I have only clutches of six, five and four and odd eggs in my own series. The eggs as a series are a much deeper, richer buff than they are in the typical form, though I have one clutch of three which are the same in tint as those of that bird. The markings are quite similar.

Twenty-eight eggs average 50.9×37.8 mm.; maxima 53.0×40.0 mm.; minima 49.0×36.2 mm.

(1916) *Lophura rufa* (Raffles).

THE BLACK-BREASTED FIRE-BACK PHEASANT.

Lophura rufa, Fauna B. I., Birds, 2nd ed. vol. v, p. 316.

This handsome Pheasant only occurs within our limits in the South of Tenasserim, while it is also found in South-West Siam and the Malay Peninsula to Sumatra.

Very little is known of the life-history of this bird, and Robinson and Kloss do not include it either in the 'Common Birds of the Malay States' or in the second volume of 'Hill-Birds.' It is a bird of the most impenetrable forests and jungles, both in the plains and foot-hills, but does not apparently ascend the latter to any great height.

The only eggs I know of supposed to have been laid by wild birds are two obtained from the Waterstradt collection, and these are said to have been collected by natives and taken from "a nest composed of dead leaves, grass and bamboo spathes under some thick low bushes in evergreen forest." Both parent birds were caught on the nest and are in the Waterstradt collection.

Hume also had an egg laid in captivity, and all these three eggs are quite alike. Hume calls his a delicate *café-au-lait*, but I should rather call the colour a very pale dull buff. The surface in all these eggs is smooth but with little gloss, while my two eggs are stained here and there, evidently from the rubbish they were lying on.

The three eggs measure 52.5×39.3 mm., 50.9×39.1 and 57.1×39.6 mm. In shape they are broad blunt ovals, rather like *Gennæus* eggs but with a thinner shell.

(1918) *Gennæus hamiltonii* *.

THE WHITE-CRESTED KALIJ PHEASANT.

Gennæus hamiltonii, Fauna B. I., Birds, 2nd ed. vol. v, p. 320.

This Kalij Pheasant occurs from the Indus on the West to Nepal as far as the Gogra in the East. Hodgson obtained a skin from West of Jamla, presumably in Nepal, but with no definite locality, and Hume thought it most probably came from Garhwal or some place farther West, where it is very common.

It is found almost from the foot-hills up to at least 11,000 feet. Hume actually found it breeding at 1,400 feet, but this is very

* I have little doubt that eventually the whole of the Kalij and Silver Pheasants will be treated as subspecies of the one species, *nyctihomerus*. This would create a species with a great and unwieldy number of races, but might be more technically correct. If kept in sections the *horsfieldii* group would come under *leucomelanos* (1790).

unusual and, though a certain number of birds breed at 4,000 feet and under, most do so between 6,000 and 9,000 feet.

The two things needed by this Kalij Pheasant for its nesting site are ample cover and water not too far away. Its nest may be placed in thin forest with thick undergrowth; evergreen forest with plenty of ferns, brambles and bracken; ravines and water-courses with rocky sides, well covered with weeds etc.; or in bamboo-jungle with very little undergrowth at all.

As regards the nest Hume writes: "The Common Kalij hardly makes a regular nest. It gets together a pad, sometimes rather massive, sometimes very slight, of fine grass and coarse moss-roots, mingled with a little grass or a few sprigs of moss, and on a slight depression in the centre of this the eggs are laid. One which I measured *in situ* in May 1871, in the Valley of the Sutlej just below Kotegarh, was circular, 11.5 inches in diameter and 4 inches in thickness outside, with a central depression 6 inches wide and nearly 2 inches in depth in the centre. Others again have been merely linings to a slight hollow in the ground, either natural or scratched by the birds; I have seen a great many nests of this species, and they were generally very scanty. The nest is usually very well concealed under tufts of fern (they are very fond of the fern-clad hill-sides), grass or "riugall," as the natives call the slender dwarf hill-bamboos."

The breeding season lasts from the middle of April to the end of June, the great majority of eggs being laid in the last fortnight of April and first fortnight of May in the lower elevations, and about ten days later in the higher.

The number of eggs laid varies from four to fourteen. Dods-worth found four and Whympers took five hard-set. Hume had thirteen brought to him, and both Jerdon and Wilson record as many as fourteen. The usual number is eight to ten.

In appearance they are just like the eggs of the domestic fowl and are similar in shape and texture. In colour they range from a pale creamy or buff-white to a warm reddish-buff. Hume says that sometimes they are "a rich reddish buff, even richer and redder than any specimens of the Peafowl's eggs that I have seen." Whympers also once found a clutch of five eggs, three of which had been broken and eaten by a civet-cat, which were practically white.

One hundred eggs, including most of Hume's which I have remeasured, average 49.5×37.0 mm.: maxima 53.1×39.1 and 50.8×40.0 mm.; minima 44.1×36.3 and 48.2×34.3 mm.

Hume thinks this Pheasant is monogamous, and says that he has many hundreds of times flushed both parents with their young broods. In former times every one wrote of all Pheasants and of many other Game-birds as if it had already been proved that all were polygamous. Of recent years more and more sportsmen have come to the conclusion that most of these birds are monogamous, and certainly my own experience confirms this.

During the breeding season they are said to be very pugnacious, and "Mountaineer" (*i. e.*, F. Wilson) writes:—"The males have frequent battles. On one occasion I had shot a male, which lay fluttering on the ground in its death struggles, when another rushed out of the jungle and attacked it with the greatest fury.

"The male often makes a peculiar drumming noise with its wings, not unlike the sound produced by shaking a piece of cloth in the air. It is only heard in the pairing season, but whether to attract the attention of the females or in defiance of his fellows I cannot say, as I have never seen the bird in the act, though often led to the spot where they were by the sound."

Judging by analogy from the habits of the Black Kalij I have no doubt the call is one of defiance.

(1919) *Gennæus leucomelanus* (Lath.).

THE NEPAL KALIJ PHEASANT.

Gennæus leucomelanus, Fauna B. I., Birds, 2nd ed. vol. v, p. 322.

From the Gogra on the East this Pheasant is found throughout Nepal as far West as the Arun River. How much farther East is not known, but probably the Arun River forms its Eastern limit. I received several skins from Dhamkhata on the Tamra, a tributary of the Arun. Nepalese traders at Pankabari and Jalpaiguri bring down this species for sale in the markets. The birds were brought in with their eyes sewn up and I understand the sale is now prohibited.

So far as is known this Pheasant breeds in much the same kind of country as that frequented by the preceding bird, and between elevations of 6,000 and 9,000 feet, but possibly both higher and lower than this.

The only eggs known are two eggs given to me by Dr. Coltart and five more which I later acquired from his collection after his death. These eggs were brought in by Nepalese from somewhere in Nepal above Bettiah, and were given or sold to Mr. Ferry, who gave them to Dr. Coltart.

Of these eggs the clutch of five were taken on or about the 23rd May and the pair on the 25th June.

All seven are a warm, but not bright, buff in colour and are typical *Gennæus* eggs in shape and texture, smooth but not highly glossed.

In size they vary from 46.1×27.7 mm. to 53.0×39.0 mm.

(1920) *Gennæus melanotus* (Blyth).

THE BLACK-BACKED KALIJ PHEASANT.

Gennæus melanotus, Fauna B. I., Birds, 2nd ed. vol. v, p. 323.

Probably the Arun River forms the Western boundary of this race of Kalij. East it is found throughout Sikkim, and it certainly

extends into Bhutan, but how far is not known. Jalpaiguri birds are of this species, but birds from North of Goalpara are *horsfieldii*, though in some cases showing traces of white on the breast.

This Pheasant is most common between 2,000 and 4,000 feet, but occasionally breeds as low as 1,500 feet and often as high as 6,000 feet. I have no record of its breeding in the plains, but Beavan found it at Pankabari in the foot-hills, where it has been known to breed.

It is a bird of forest and thick jungle like all Kalij Pheasants, but by no means keeps exclusively to such. It is common in deserted cultivation, secondary growth, bamboo-jungle and formerly not infrequently nested in tea-land. Here, after the first hoeing, the weeds quickly spring up and form quite dense cover under the tea-bushes in which the birds can wander about and nest well concealed. Nowadays the intensive cultivation of tea, the constant weeding and hoeing that is kept up, gives the birds little chance of hatching or even laying a complete clutch and I am told, by tea-planters in the Darjiling district, that nests in tea are very seldom seen.

The nest is a very poor affair, nothing more than a collection of dead leaves and grass gathered together by chance or, less often, by the birds themselves, lying in some natural or scratched out hollow under the protection of a bush or tree. When they breed in bamboo-jungle the birds generally scratch a hollow in the ground which they fill with bamboo spathes and leaves, and then in the centre of the pile make a depression for the reception of the eggs.

I have never seen a nest of this species myself, but all my correspondents speak of the nest as well concealed. A very favourite site is a ravine in forest where the undergrowth is dense, and the birds also much favour the tangled undergrowth and small jungle which cover deserted cultivation after one or two rainy seasons have passed.

In the hills tea cultivation may cover wide areas yet leave ravines, pockets and hollows, too steep and difficult to cultivate and covered with dense virgin forest, these forming retreats much beloved by the Pheasants for breeding purposes, as the open land all round furnishes them with good feeding ground.

They start laying in late March and breed throughout April and May in the lower levels, but above 4,000 feet they seldom lay before late April and continue until the middle of June.

The normal full clutch does not exceed six or seven, but as many as ten are sometimes laid and, on the other hand, I have a clutch of three taken by Masson which were hard-set.

They are typical Kalij eggs in all respects, vary in depth of colour to the usual extent, and are the normal hard glossy texture and broad ovals in shape.

Hume gives the average of "a large series" as 48.5×36.3 mm. The average of sixty-one eggs, including most of Hume's, measured

by myself is 48.7×37.3 mm. : maxima 52.1×39.6 and 50.1×39.8 mm. ; minima 44.0×34.7 and 46.8×34.0 mm.

Gammie refers to the drumming of this Pheasant, common to all the members of the genus, which he calls "an expression of joy," and says that the natives say it is a sign of approaching rain. As we all know now it is a call of defiance, a challenge often answered by similar drumming, a meeting and a fight. It certainly occurs most constantly before the advent of the rainy season, as this coincides with the height of the birds' breeding season.

Gennæus horsfieldii.

THE BLACK-BREASTED KALIJ PHEASANT.

(1921) *Gennæus horsfieldii horsfieldii* * (Gray).

THE BLACK-BREASTED KALIJ PHEASANT.

Gennæus horsfieldii horsfieldii, Fauna B. I., Birds, 2nd ed. vol. v, p. 324.

This race has the widest range of all the Kalij Pheasants. It is found over the whole of Assam, North and South, extending East over Burma to the Irrawaddy. South it extends to Akyah in Arakan, while it is also found in the humid valleys leading from the Chin Hills, though on the higher ground and drier areas its place is taken by *williamsi*. Livesey informs me that he has met with what he considers typical specimens of this Pheasant in Myitkyina, Sadon and at the lowest elevations in the Bhamo hills, but I have not yet seen any skins of this race from these areas.

Like all other Kalij Pheasants the present bird breeds in forest or in dense cover of some kind. What this may be does not seem to matter, and I have found nests in deep virgin forest, in thin forest with ample undergrowth, in ravines in Pine-forest which have hush and fern undergrowth, secondary growth and bamboo-jungle. They like water to be at no great distance, and prefer good cover close to open spaces, such as glades, natural grass patches, streams etc. and, above all, cultivated land and patches of hill-rice or mustard where they can wander about and feed in the cool of the mornings and evenings. They breed freely in the plains to a considerable distance from the foot-hills, and they are found up to some 6,000 feet, but are seldom met with over 4,000 feet and breed more often under 2,500.

There is no real nest, and I think this bird scratches out the required hollow less often than its cousins do. As a rule it hunts round for some natural hollow in among the bushes but, frequently, failing

* As I have already noted (footnote, p. 208) *horsfieldii* should probably be specifically united with *leucomelanus*, and as this is the oldest name it would be *Gennæus leucomelanus horsfieldii*.

this, scratches together a pile of fallen debris, leaves, twigs, roots etc. and then in the middle of this forms a depression, sometimes 4 to 6 inches deep, to take the eggs. I have occasionally seen the pile of leaves raked together to a height of about 8 inches and to a breadth of a couple of feet or wider, but more often it is only 2 or 3 inches high and about a foot in diameter. When in bamboo-jungle I have seen eggs laid on the deep mat of fallen bamboo-leaves without any further preparation of any kind. The eggs agree so well with their surrounding dead yellow bamboo-leaves that they need no further concealment, while the parent bird, until incubation is advanced, sneaks so quietly off the nest that she often gets away unnoticed. When the eggs are much set or she is suddenly startled off her eggs she makes a tremendous commotion in escaping, often calling loudly at the same time.

There is a quite definite breeding season, three out of four nests with eggs being found between the 15th April and the end of May. At the same time I have taken eggs every month of the year from February to October. Probably many birds have two broods. After the first season there seems to be a lull in laying between the end of May and early July, but in that month and August a number of nests may be found, though never in the same numbers as in April.

The full complement of eggs in a clutch varies from five to eight, and I have taken clutches as small as three (hard-set) and as big as ten.

The eggs are typical of those of the genus. The colour is generally a warm reddish-buff, but I have a clutch of six eggs taken in the Khasia Hills which are almost white and another of three which are very deep, rich, reddish-buff.

Occasionally the eggs are buff quite strongly tinged with pink and, even more rarely, they are stippled with white exactly like the eggs of *Polyplectron* nearly always are. I have one clutch a deep reddish-buff very freely marked with white at the larger end in this manner, and another clutch of six of the rare pinkish type also speckled all over with white.

I have seen a few quite pointed eggs of this subspecies, but these were among a very great number and, possibly, similarly large series of eggs of the other forms would also show some of them.

This Kalij is, I am sure, monogamous. I have often come across the two parents looking after the young, while the cock is nearly always to be found somewhere near the hen when she is sitting. One often sees two or three old cocks in the company of what appear to be many females, but these parties I believe consist only of the cocks, their mates and the young, all of course in female plumage. Watson (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 582, 1915) writes:—"I came across a cock Kalij Pheasant (*G. horsfieldi*) looking after a flock of young a few days old. I saw no sign of the hen, though I watched for many minutes. The cock was very

aggressive and ran round demonstrating, often coming within 10 feet of me."

The hen sits fairly close but seldom lets one get very near, sneaking off without a sound if she thinks she can do so without being seen. If caught suddenly she will flatten slowly out on the nest, shut, or nearly shut, her eyes and hope to escape detection and then, if the intruder approaches still closer, flusters off with the usual commotion.

Incubation takes twenty or twenty-one days, and during the heat of the day the hen often leaves the eggs uncovered for several hours when the sun is out, but scurries back if the sky becomes overcast or any rain falls.

They are as pugnacious as the rest of the family and the cocks fight often, though they are not nearly so brave as the Jungle-fowl and stop the fighting as soon as one bird thinks he has had enough. Often two cocks will meet and after much parade and walking round each other decide there is nothing to fight about after all. I once saw a fight between a cock Kalij and a Jungle-fowl, and the latter, though only half the weight of the former, won easily and the Kalij, had he been allowed, would have fled long before the end, which resulted in his death from the Jungle-cock's spur and the catching of both in a blanket.

(1922) *Gennæus horsfieldii williamsi* Oates.

THE ARAKAN KALIJ PHEASANT.

Gennæus horsfieldii williamsi, Fauna B. I., Birds, 2nd ed. vol. v, p. 320.

It is very difficult to define the exact range of this race, as North, over a wide area, the birds are in a transition stage between *horsfieldii* and *williamsi* and in the South between *williamsi* and *oatesi*. It occurs in the moderately high hills between the Manipur, Oyu and Irrawaddy Rivers. It is found in the Arakan Yomas in the South and in the East at Minbu and Thayetmyo. From the North I have seen specimens obtained in Homalin and Tammu.

So far as is known at present it breeds between 2,000 and 4,000 feet, but has been known to breed at or near Fort White in the Chin Hills at about 6,000 feet.

Hopwood and Mackenzie obtained nests and eggs in the Lower Chindwin, Wickham a rather doubtful clutch of three eggs at Tiddim and Livesey another of five, quite certainly identified, at Lotow, about 90 miles South of Haka, between 4,500 and 5,000 feet elevation.

The nidification differs in no way from that of *horsfieldii*, nor are the eggs separable from those of that bird.

All the eggs that I have seen have been laid in April and May, though the breeding season probably lasts longer than this.

Twenty-one eggs average 47.8×37.8 mm. : maxima 54.0×37.7 and 48.0×38.1 mm. ; minima 43.6×34.8 and 45.2×33.6 mm.

Gennæus lineatus.**THE SILVER PHEASANT.**(1923) **Gennæus lineatus lineatus** (Vigors).**THE BURMESE SILVER PHEASANT.***Gennæus lineatus lineatus*, Fauna B. I., Birds, 2nd ed. vol. v, p. 328.

The area occupied by this Pheasant includes the extreme South and East of the Arakan Yomas; North they extend to Thoungyi, or about up to 20° West of the Sittang River but only as far as Thaungoo and Kolidoo on the East of that river and then only in the lower hills close to it. South it crosses the Sittang River, and a Silver Pheasant of some kind has been recorded from Yeh, as far South as 12°, though it is not quite certain that it is the same race. It does, however, occur in South-West peninsular Siam and in Tenasserim South of Tavoy. To the North it apparently works up the lower valleys and hills past Fort Stedman as far East as Kengtong, whence I have seen quite typical specimens.

Much still remains to be worked out regarding the distribution of this form and its nearest neighbours. The various races seem to wander into one another's areas in the most curious manner, doubtless these being governed by some laws which we have not yet been able to ascertain, though elevation must have a great bearing upon it. Again, in all the intervening areas one finds intermediate forms ranging from the extremes of each race to an extraordinary degree of variation.

Most of my correspondents say, as did Oates and Bingham in Hume's time, that this Silver Pheasant breeds from the foot-hills up to 2,000 feet, rarely up to 4,000, and that it almost invariably selects bamboo-jungle, thick secondary growth or scrub in which to breed, and that it is very rarely found in the humid evergreen forest. Gyldenstolpe, however (Swed. Exped. Siam, p. 157, 1816), writes:—"Silver pheasants belonging to this species were rather common in the dense evergreen jungle which covers the hills dividing Tenasserim and Siam. In the neighbourhood of Hat Sanuk (lat. N. 12°) they were exceedingly abundant. During my stay in North-West Siam I once caught a glimpse of a Silver Pheasant when I was climbing up one of the steep hills at Doi Par Satring (lat. N. 20°). It looked much more white than *G. lineatus*, and was probably *G. nyctemerus ripponi*."

Cook, who sent me several clutches of eggs from Tenasserim, writes:—"I found several nests in bamboo-jungle or in thin scrub round about cultivation near villages. I found none in forest."

Mackenzie and Hopwood both say almost exactly the same, but at Thoungyin Stockley came across a Silver Pheasant in very thick

forest where it was a tangle of fallen and living trees with the thickest of undergrowth (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 174, 1923).

The nest is the usual collection of leaves and débris, with a depression in the centre for the eggs. Very often this is placed at the foot of a clump of bamboos, sometimes right in the clump, while at other times it may be among bushes and scrub.

I have now seen a big series of this Pheasant's eggs, mostly taken by Cook, Mackenzie and Hopwood, but so far all have been laid in March and April; Oates and Bingham also found eggs only in these two months.

Five to seven eggs form the full clutch and none larger has been recorded.

They follow the usual range of variation but most are a warm creamy buff, while I have seen no eggs nearly white or very pale cream. On the other hand, I have one clutch, taken by Cook, exceptionally deep red-buff.

Forty eggs average 47.7×36.9 mm.: maxima 50.2×36.7 and 48.2×38.2 mm.; minima 44.1×35.9 and 47.1×35.5 mm.

Oates writes: "The chickens, as soon as they are hatched, are very strong on their legs and run with great speed. It is astonishing in what a short time the little birds make themselves invisible. The mother is a great coward, running away at the slightest alarm."

As regards the chicks the description of the above would do for those of all species, but many Kalij Pheasants show the greatest concern for their young, though, probably, the safest thing for the chicks is to clear off at once and trust to their hiding themselves instinctively. If one keeps quite quiet after disturbing a brood of Kalij chicks, the mother very soon returns and calls from close by, and then one sees each tiny chick become visible and run to its mother.

In about ten days, or less, the chicks fly well and fast, and then escape by flying and no longer attempt concealment.

(1924) *Gennæus lineatus oatesi* Ogilvie-Grant.

THE PROME SILVER PHEASANT.

Gennæus lineatus oatesi, Fauna B. I., Birds, 2nd ed. vol. v, p. 329.

This is the race linking *horsfieldii* and *williamsi* with true *lineatus*, and is found in the Arakan Yomas from the North to the extreme South, where it meets the last-named bird. Its Eastern boundary appears to be the Irrawaddy River.

Feilden's notes cover what is known of this bird's breeding haunts: "This bird is tolerably common in the hills West of Thayetmyo, but appears to be unknown to any but Burmans. It seems to require rock and very steep hillsides, covered by long grass for shelter,

and flat alluvial soil, bare of grass and covered with brushwood and young trees, for feeding ground."

Thirty years after this was written Cook found them common in the same ground and equally common on bamboo-covered slopes between 1,000 and 2,000 feet.

Seikden obtained young birds in August near Thayetmyo, but the only eggs I have seen were all laid in March and April and were in clutches of two, three and five, the two first undoubtedly incomplete clutches.

Ten eggs average 47.0×37.1 mm. and vary between 48.8×39.2 and 46.1×35.3 mm.

They are, of course, indistinguishable from those of the preceding bird.

(1925) *Gennæus lineatus sharpei* Oates.

THE SALWEEN SILVER PHEASANT.

Gennæus lineatus sharpei, Fauna B. I., Birds, 2nd ed. vol. v, p. 330.

This Silver Pheasant occurs in the South Shan States, East Central Burma and Siam but, with the material available at present, it is quite impossible to define its limits with any approach to accuracy. We have specimens from Dargwin and East of the Sittang and Mewang Rivers and up to the Mennam River. Again in the South we have birds from Rabeng and Muleyit, and it may occur in the higher hill ranges as far as 15° latitude, where, however, both at M. Rat Bouri and M. Petcha Bouri the true *lineatus* is said to be found.

It appears to be a bird of the more open, higher hills, but the naturalists who have worked the country inhabited by it have left nothing on record.

Three eggs taken by Gairdner at or near Rat Bouri and attributed by him to this race are quite typical in colour, a warm buff, but are rather unusually long in shape. They measure 45.8×35.8 , 45.0×35.3 and 45.2×35.1 mm. They were found on the 3rd of April.

(1928) *Lophophorus impejanus* Lath.

THE IMPEYAN PHEASANT, or MONAL.

Lophophorus impejanus, Fauna B. I., Birds, 2nd ed. vol. v, p. 335.

This grand bird ranges from Afghanistan into Gilgit, Kashmir, Garhwal, Nepal, Sikkim, the Chambi Valley, Bhutan and South Tibet to the Mishmi Hills. It is common on the Afghan boundary, but its extension West has not yet been ascertained. Whitehead (Ibis, 1909, p. 268) says it is common on the Safed Koh from about 9,000 feet up to the tree-limit.

It is a bird of high-level forests, breeding occasionally at 8,000 feet, while it has also once been recorded at 7,000 feet. More often it breeds from 9,500 feet upwards.

Whymper gives me the following excellent account of its breeding :—
 "The majority of nests, if one may use such a term, are to be found in forest consisting of big trees but not with very thick undergrowth; indeed I have more than once taken them in places where the growth was so light one could walk in comfort, except that the ground was much broken. The nest is a mere scratching in the earth, generally hollowed out by the bird itself, under the shelter of a big bush, the bole of some large forest tree or, perhaps, a rock. So far as I have seen there is no attempt made to form a nest in the hollow. Where the trees are deciduous and many leaves have fallen these naturally collect in any hollow and thus form a bed for the eggs but, in evergreen forest, such as forms the usual habitat of the Monal, the hollow is often quite unlined except for a few casual leaves and a few feathers from the bird itself. I have never taken more than 5 eggs in a clutch but have known birds to incubate on three or four only, while clutches of four and five eggs are about equally common."

This description agrees well with that of Wilson ("Mountaineer"), who found them breeding in the same Garhwal Hills between 8,000 and 12,000 feet. Rattray again gives the same description, but both he and Bates sometimes found the nest in very dense matted undergrowth, the former among rhododendrons and the latter in a tangle of ferns, fallen branches and weeds etc., at 7,500 feet near Pahlgaon in Kashmir.

They breed principally in May, while I have seen eggs taken from the 20th April to the 27th June and have no doubt that in the highest elevations they sometimes breed still later. It should, however, be noted that Whymper obtained eggs at over 10,000 feet on the 1st May.

The ordinary full clutch is certainly four to six, but Cock recorded five to eight eggs at Dharmasala, Bates took eight eggs in a nest at Pahlgaon and Captain Matthews says they lay up to nine. I have also a clutch of eight eggs which were sent to me from Gilgit. On the other hand, Wilson sometimes found only two or three, and Beebe ('Pheasants,' vol. i, p. 112, 1918) found a hen sitting on two hard-set eggs.

As Hume remarks, the eggs remind one very much of those of the Turkey, but in shape they are more broad regular ovals than the pointed ovals of that bird. The texture is truly Galline, hard, close and with a distinct gloss when fresh. The ground-colour varies from the palest yellowish-buff to a deep rich reddish-buff. They are freckled, speckled and spotted with reddish-brown, distributed over the whole surface, in some eggs thinly and in others densely. Occasionally in addition to the freckles there are a certain number of small blotches, and I have two eggs of which one has

a cap at the larger end of rich red-brown, while the other has a similar but very small patch of colour at the small end.

Since I wrote the Pheasant volume of the 'Game-Birds of India' and the 'Fauna of India' I have received some fine sets of eggs of this bird, showing much richer coloration than any I had previously seen. On the other hand, hard-set, bleached specimens are very poor washed-out-looking specimens.

Seventy-four eggs average 63.5×44.9 mm. : maxima 68.7×47.6 and 64.3×48.2 mm. ; minima 57.1×42.3 and 61.0×39.6 mm.

It is very doubtful as to whether this bird is monogamous. "Mountaineer" says that "the young broods in the forest are generally found with the hen-bird only. Indeed I doubt if the Monal pairs at all." There is no doubt that during the breeding season cock birds are sometimes found together with no hens near, and the cock never appears to be hanging round the nesting site during the breeding season.

The courting display is thus described by Major Roden (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 573, 1899) :—"When shooting in the Himalayas this April, I noticed early one morning a pair of Monal Pheasants on a flat terrace on an open hill side. After being busily engaged for some time in their usual digging operations, the hen bird stopped and uttered her call note several times, upon which the cock, who at the time was some little distance away, ran up to her with his wings raised high above the back, tail spread and neck and body feathers distended. He then moved quickly to and fro for a few seconds in front of the hen, who stood looking quietly on at his performance ; he then abruptly closed his wings and tail, turned about and went back to his feeding ground while the hen went on with her breakfast. As the early morning sun was shining on the birds, the sudden appearance of the cock in the above performance was most splendid to look upon, the beautiful metallic hues of the wings and throat, with the pure white of the back and the chestnut-coloured tail spread like a fan behind, shone out most gorgeously. I believe in all courting displays among birds of fine coloured plumage, the hen takes a most passive part but, in this case the lady, by her calls, appears directly to have invited or encouraged the display."

(1929) *Lophophorus selateri* Jerdon.

THE MISHMI MONAL.

Lophophorus selateri, Fauna B. I., Birds, 2nd ed. vol. v, p. 337.

This gorgeous bird has its habitat in the higher hills of Assam, North of the Brahmapootra and extending thence into Yunnan.

So far as we know this Pheasant keeps to dense forest at 9,000 feet and over. Forrest found it at 10,000 and 12,000 feet in Yunnan and Chatterton came across a flock during the Abor expedition

at about 9,000 feet. Here the ground was very steep and broken with a thick growth of Oak and Rhododendron, they were not, however, found in the magnificent Pine-forest growing at the same and higher elevations.

The only known eggs are a clutch of five eggs brought in to me by an Abor on the 7th June and taken three or four days previously in the same forest where they were seen by Col. Chatterton. The skins of two males and one female, the latter said to have been trapped on the eggs, were brought in at the same time.

The eggs are exactly like fairly richly coloured, well-marked eggs of the preceding bird, the five measuring 63.0×45.3 , 63.0×46.1 , 65.0×45.0 , 62.1×45.2 and 63.0×45.1 mm.

(1930) *Crossoptilon harmani* Elwes.

THE MISHMI HORNED PHEASANT.

Crossoptilon harmani, Fauna B. I., Birds, 2nd ed. vol. v, p. 339.

This Horned Pheasant enters our limits in the Mishmi and Abor Hills North of Assam, and occurs in South-East Tibet. It is certainly common on all the hills on the Northern Assam watershed, as it is well known to the natives.

Its normal habitat is probably between 10,000 and 15,000 feet, but it has been obtained at 8,500, while the type-specimen is said to have been obtained at 6,000 feet.

Bailey (Journ. Bomb. Nat. Hist. Soc. vol. xxiv, p. 77, 1916) writes:—"It is common in the lower Tsangpo Valley in Tibet. The farthest point West at which we saw it was the East side of Putrang La, where there were numbers in the Rhododendron-scrub at about 15,500 feet. The lowest elevation at which we found this Pheasant in the Tsangpo Valley was at about 9,300 feet at Gyala, but I saw traces of them in Po Me at about 8,500 feet. These birds frequent forest-covered hills and in the higher elevations dwarf Rhododendron-jungle, where they feed on the grassy clearings among the hills. A well-grown young one was shot on the Putrang-La on 14th August and broods of freshly hatched chicks were seen at Gyala, 10,000 feet, on the 18th July."

Four eggs were brought to me by Ahors and were taken on the 26th May at Gyangpu in the inner Abor Hills. I had tried to get these men to get me *Tragopan* and *Lophophorus* skins and, on this occasion, they brought me two of the latter and one *Crossoptilon* skin, but they had had heavy rain *en route* and the skins were all soaked and decayed.

In shape the eggs are broad regular ovals, very little compressed at the smaller end. The texture is very fine and close but not so hard as it is in most Gallinaceous birds-eggs, and the surface is more smooth and shiny than glossy. It reminds one much of

Ducks' eggs, especially those of the Pochards. The colour is a uniform grey-green without any markings.

They measure 58.5×41.6 , 56.2×41.7 , 58.4×41.6 and 56.7×42.0 mm.

The only information I could get was that they were laid on the ground in dense forest, while the elevation of Gyangpu is about 11,000-12,000 feet, and is a great ground for Takin, which animal the Abors were very anxious to show me.

Subfamily PERDICINÆ.

(PARTRIDGES and their nearest Allies.)

(1931) *Tragopan satyra* (Linn.).

THE CRIMSON HORNED PHEASANT.

Tragopan satyra, Fauna B. I., Birds, 2nd ed. vol. v, p. 343.

This Tragopan extends from Garhwal through Nepal and Sikkim to Assam, North of the Brahmapootra, to the Hills East of Darrang. Whymper has shot the present species of *Tragopan* on the East bank of the Alaknanda River and *melanocephalus* on the West bank of the Bhagirathi, and says that, roughly speaking, the upper waters of the Ganges may be taken as the dividing line between these two species.

It is found between 9,000 feet and the highest forest-line, even in the Rhododendron- and bush-jungle above the tree-forest, up to some 14,000 feet.

Hume obtained eggs from natives who took them in Kuman in May, but they cannot be accepted as absolutely authentic.

I have a clutch taken for me by D. Macdonald or his son John at the head of the Chamb Valley at an elevation of about 10,000 feet just before it dehouches into Tibet. A letter sent with the eggs and with the skins of two females, said to have been shot off the nests, reads as follows :—"The eggs of this Pheasant, *Cham-dong* in Tibetan, were taken in the Rhododendron- and Oak-forest in the Chamb Valley, and were found in a nest which was built in a tree about 20 feet from the ground and quite hidden from view until the hen bird flew off the nest and so disclosed it. The two eggs already had the appearance of chicks in them. The forest here is very thick but stunted, and the ground much broken up with huge rocks covered with moss and fern. The ground, trees and rocks seem to be ever wet and damp. The nest was just a jumble of very old dead twigs and branches, mostly rotten and very fragile; perhaps the bird did not build it but just found this old mass of sticks and turned it into a nest.

"The other nest was the same but empty and lower down in the tree; the men could almost reach up to it.

"The natives tell me that they only lay two eggs as a rule, never more than four and, certainly, one only sees two chicks with the old birds."

I have also two eggs purchased from the Stoate collection which were collected in Garhwal, and which are undoubtedly Tragopan eggs, though I cannot trace who took them. They were found on the 2nd July.

These four eggs of wild birds are all broad ovals, not at all pointed at the smaller end, and average 54.7×42.2 mm.

I have also several eggs given me by the late Mr. W. Shore Bailly and some laid in zoological gardens etc. All these, though absolutely well authenticated, are much bigger and are all more or less distinctly pointed. These ten average 63.2×43.4 mm.

The colour in my two pairs of wild-laid eggs are a very deep brick-red freckled all over with deeper red and looking very much like uniformly coloured Peregrine eggs. The Stoate pair are paler and duller but yet darker than nearly all the eggs laid by birds in confinement. The eggs laid in captivity run from a very pale yellowish-stone flushed at the larger end with darker red-buff to a warm buff freckled all over with darker reddish-brick.

It is interesting to note that all Shore Bailly's birds made stick-nests in open baskets put up in apple-trees at heights between 10 and 20 feet from the ground; it seems, therefore, quite certain that normally it is a tree-breeder like others of the genus.

The breeding season apparently commences in early May and lasts through June, some birds in the highest elevations not laying until July.

In captivity the breeding season is much more prolonged, and sometimes several eggs are laid on the ground and then taken no further notice of.

The display of the male *satyra* during the breeding season is very fine but quite similar in action to that of other species, and need not be given in detail, as it is given further on under *blythi* as seen in a wild bird.

(1932) *Tragopan melanocephalus* Gray. *

THE WESTERN HORNED PHEASANT.

Tragopan melanocephalus, Fauna B. I., Birds, 2nd ed. vol. v, p. 345.

This Tragopan is found from the West Bank of the Bhagirathi River in Garhwal to Hazara and Kashmir.

There is a good deal of information about the breeding of this Pheasant, which all agrees in describing the bird as breeding between 8,000 and 12,000 feet in dense forest, in Ringal-jungle, in open glades and hillsides covered with scrub and small trees.

A curious point, however, is that sometimes the nest is described as being on the ground and sometimes on a tree, so it seems certain that both kinds of situations are selected.

Captain Latour writes to Hume, sending him eggs of this bird :— "I was shooting on a range of hills (in Hazara) between 8,000 and 11,000 high. The Argus in parts very plentiful, the hills covered with pine-trees. They appeared to affect the vicinity of snow nullahs and landslips where there was a fair quantity of undergrowth and where there were plenty of rocks.

"I was going through a pine-forest, and had reached a place where an avalanche or landslip had carried away all the pine-trees, and in their place small bushes and shrubs like a hazel had sprung up. I was descending this when the bird got up almost at my feet. The nest was on the ground, very roughly formed of grass, small sticks and a very few feathers ; it was very carelessly built."

The nest apparently contained six eggs, four of which are in the British Museum, one in my own collection and one untraced.

On the 3rd June, 1908, Mr. F. L. Hughes found a nest in the Makhan Nallah, Chamba, concerning which he informed me : "I do not know exactly what the elevation was, but I should say just about 9,000 feet. The nest was placed on a slanting tree about 10 feet from the ground, in a hollow where a large branch had been torn off by some storm. It was about a foot in diameter and was composed of a few sticks and grass, the lining being entirely of this material, and contained three eggs just showing faint signs of incubation. The tree on which the nest was placed was a wild cherry, and was on a steep khud, about 100 feet or so above a stream. The slope was well wooded with the ordinary local trees, chestnut, wild cherry etc. There was not much undergrowth, what there was consisting of elder, so far as I can remember."

In 1910 a nest was found in Garhwal by Mr. Whympere, who wrote to me :—"The only nest I ever saw of the Tragopan, presumably *melanocephalus*, was in the Nila Valley, West of the Bhagirathi River in Garhwal. The birds were still about the nest, but this had been plundered by some vermin and deserted ; it was quite a respectable stick-nest with a little grass lining which had been much disturbed by the plunderer. It was placed under the protection of a small bush growing in an open glade in very dense Ringal-jungle on a steep and rocky hillside.

"The fragments of eggs, in one case practically half an egg, scattered round the nest agree fairly well with Hume's description."

Finally, Mr. D. Donald took two eggs in June 1901 from a nest of sticks in a tree, which he gave to Colonel Rattray and the latter to me.

In addition to all these records Beebe says that he disturbed a hen from a stick-nest in a tree which was empty.

The eggs agree in colour and general description with the eggs of *satyra* laid in captivity, and are pale buff very feebly freckled with

darker, in one egg only a rather richer buff somewhat more thickly and boldly freckled with deeper reddish.

Six eggs average 62.2×42.0 mm.: maxima 63.4×43.6 and 63.0×44.6 mm.; minima 59.6×42.0 mm.

Like other Tragopans this bird is monogamous and is a good husband and father, looking after the young and remaining with them until in the following Spring they are ready to take up their own domestic duties.

Tragopan blythi.

THE GREY-BELLIED TRAGOPAN.

(1933) *Tragopan blythi blythi* (Jerdon).

THE NAGA HILLS GREY-BELLIED TRAGOPAN.

Tragopan blythi blythi, Fauna B. I., Birds, 2nd ed. vol. v, p. 347.

So far as is known at present this Tragopan occurs in the hills of Assam South of the Brahmapootra from the Barail Range in North Cachar, through the Naga Hills and the Patkoi Range into North-West Burma and through Manipur into the Chin Hills.

Nothing is known of the breeding of this Tragopan beyond what was told me by the Henema Nagas, all fine field naturalists and very truthful. They told me that the birds breed in April and May, invariably making a nest in a tree some 10 or 20 feet up, on a stump with a convenient hollow or on the top of a bush with foliage sufficiently thick to form a platform for the nest. In three cases out of four the nest is placed actually in a tree and consists of a mass of small sticks, branches etc. very loosely and badly put together and lined with grass. One man who brought me in some Tragopans he had trapped told me he thought the birds often made use of old nests of other birds or masses of debris which had collected, and then built further on these and added linings. He told me he had once taken eggs—which of course he ate—from a nest built on a lot of rubbish collected in a creeper covering an old tree. No Naga had ever seen or heard of a nest on the ground.

A Tragopan in my aviary, which had been recently trapped, tried to lay her eggs on the top of a perch and, naturally, they fell and were smashed but, when I put a box for her high up in the aviary, she at once adopted it and laid her fourth egg in it on a bed of grass.

Two unbroken eggs are very broad ovals in shape, the texture rather coarse and the surface smooth but dull. In colour they are uniform pale buff in appearance but, if examined closely, are seen to be a very pale stone-buff with very fine stippling of a rather warmer deeper tint.

They measure 59.7×42.6 and 57.8×45.4 mm.

The display of this Tragopan has been seen by me amid its natural surroundings and, as it is typical of the genus, I give a full description. I had been lying on the ground beside a tiny stream of water right up on the main ridge and near the top of one of the highest peaks of the Barail Range when the display took place. I had almost fallen asleep in the sun when a chuckling call in the jungle close by attracted my attention and, presently, a richly coloured brown bird made its way into the little open space in front of me. I did not recognize what it was until her mate followed her, when I saw that for the first and only time in my life I had Tragopans in the flesh before me. Presently the cock bird began to attempt to attract the hen by all sorts of antics. At first he merely came up to her and bowed and scraped with his wings slightly raised, his purple-blue horn being fully inflated and projecting forward. Then, seeing that she took no notice, he depressed his wings and walked slowly round her, swelling out his throat and breast, the feathers of which were ruffled and standing almost on end. After a short time of this ineffectual display he once more stopped in front of the hen, leaned forward until his breast almost or quite touched the ground, extending both wings over his back so that they faced the same way as his head, and stood in front of her, a blaze of crimson, his weirdly shaped horn quivering with excitement, and the wattle stretched to its utmost. After a few seconds his horn and wattle seemed to collapse and shrink away, and in a moment or two more he was quietly scratching about and feeding with his wife, who had taken no interest at all in the performance.

I have seen wattle and horn distended by my aviary birds at very close quarters, and it is extraordinary how the bird seems to give a sudden shake and in an instant both are fully expanded. On the ground the bird crouches and shakes, but on a perch he stands stiffly erect on tiptoe.

They are monogamous and the Nagas say are always in pairs both in and out of the breeding season.

(1936) *Ithaginis cruentus* * (Hardw.).

THE BLOOD-PHEASANT.

Ithaginis cruentus, Fauna B. I., Birds 2nd ed. vol. v, p. 352.

The birds of this genus are among the Game-Birds of the highest altitudes, even breeding in snow. The present bird is found in Sikkim and Nepal, the Gogra probably forming its Western limits, while in the East it extends into Bhutan, though how far we do not yet know.

* Doubtless when we get more material and know better the exact ranges of the various forms of *Ithaginis* it may be necessary to degrade some now ranked as species to subspecies. For the present I prefer to retain the classification as in the 'Fauna.'

Hooker writes of its habitat :—"This frequents the mountain ranges of Eastern Nepal and Sikkim at elevations varying from 10,000 to 14,000 feet, and is very abundant in many of the valleys among the forests of pine (*Abies webbiana*) and juniper."

Jerdon saw a family party on the Singalila ridge at 12,000 to 14,000 feet, where, now at all events, the jungle consists principally of dense ringal, though in the valleys there is thick mixed vegetation of Rhododendrons, Birch and much undergrowth.

Blanford says that all the birds he saw "were in the pine forests around Yeomalong."

As regards its breeding, all that has been recorded is Hodgson's note to the effect that "the nest is placed on the ground amongst the grass and bushes, a loose nest of grass and leaves. The eggs, 10 to 12 in number, are laid towards the end of April and in May, and the young are ready to fly in July.

"Only the mother feeds and cares for the young."

Many years ago I had sent me from Sikkim two clutches of eggs said to be those of this bird, both taken at an elevation between 10,000 and 12,000 feet by Mr. W. Macgregor. They were laid on the ground in hollows scratched in fallen leaves at the foot of bushes in Pine-forest. The eggs were very like those of Scotch Grouse; at the time no one had any idea what the eggs of this bird were like, no skins were sent me, and so they were returned to the sender. Now we know that they were quite correctly identified. The eggs were exactly the same as those of *kuseri* taken by Molesworth.

Galloperdix spadicea.

THE RED SPUR-FOWL.

(1940) *Galloperdix spadicea spadicea* (Gmelin).

THE INDIAN RED SPUR-FOWL.

Galloperdix spadicea spadicea, Fauna B. I., Birds, 2nd ed. vol. v, p. 358.

The typical form of Red Spur-Fowl is found along the Himalayan Terai from Western Nepal to Goruckpore; in the better wooded tracts of Central India from Saugor to Rajmehal and the Santhal Parganas; to the South it is found in Orissa and Madras and on the West to the hill-ranges of Mysore and, again, in the Bombay Presidency South of Rajputana and Mahableshwar.

Birds from the Malabar coast are intermediate between true *spadicea* and *stewarti*, but may for the present be retained with the former race.

This is a jungle-bird breeding in broken country at the foot of hills to a considerable elevation in the hills themselves. In the

Nilgiris Hume says they are common up to 5,000 feet and are found up to the summits. In the Nelliampathy Hills Kinloch found them extremely common up to 4,000 feet.

The Red Spur-Fowl may be found in any kind of forest, but its favourite resorts are scrub-jungle and sál-forests, while in some areas it is said to be almost exclusively found in bamboo-jungle. In Tea-gardens, Rubber estates and similar country it is often found in the ravines and broken bits of land, too rough to cultivate, in which the original jungle still grows or where its place has been taken by scrub and secondary growth. In the Chota Nagpore district we often found them haunting and breeding in quite small patches of jungle between rice-fields.

The nest is merely a scratching in the ground filled in with dead leaves and other jungle litter. The scratching may be made by the birds themselves or may be a natural one, tucked in among bushes or at the foot of a bamboo clump or a tree. Sometimes the hollow is dispensed with and the eggs are laid on the ground, where they are kept from rolling about by the rubbish surrounding them.

The principal breeding season is from January to April, but in Kanara Davidson took eggs also in May and June; Kinloch took a clutch in July in the Nelliampathy Hills, while Hume says they *may* lay again in September and October, though there is no proof of this.

The normal number of eggs laid is undoubtedly two to four, but sometimes it is possible they lay much bigger clutches. Kinloch sent me a clutch of seven taken on the 27th July in the Nelliampathy Hills which he assured me came from one nest; they are a richly coloured clutch and certainly look as if laid by one bird.

Miss Cockburn says they lay from six to ten eggs in the Nilgiris, and Davison says he has rarely found more than five, but since these records were made no clutch of more than four has been found, though many collectors have thoroughly worked the Nilgiris.

The eggs are like small eggs of the domestic fowl, perhaps on the whole rather long, narrow and pointed and, as a series, are a warm-coloured buff with very little range of variation in depth of colour.

The texture is fine, close and very hard, the surface smooth and generally with a decided gloss.

Forty-four eggs average 40.4×29.5 mm.; maxima 44.9×32.0 and 43.0×32.6 mm.; minima 37.6×28.2 and 41.4×28.0 mm.

An egg in the Hume series measures 46.9×36.3 mm. and is very probably a small egg of some Jungle-Fowl.

The Spur-Fowl is monogamous and the birds probably pair for life. While the hen is sitting the male remains close to her and, although he does not share in incubation, he is a good father and helps to rear the chicks when hatched.

The period of incubation does not appear to have been ascertained.

(1941) *Galloperdix spadicea stewarti* Stuart Baker.

THE TRAVANCORE RED SPUR-FOWL.

Galloperdix spadicea stewarti, Fauna B. I., Birds, 2nd ed. vol. v, p. 360.

This very richly marked Spur-Fowl is restricted to Travancore, where it is very common in the hills from the foot-hills up to about 3,500 feet.

Stewart and Bourdillon obtained many clutches of eggs of this Spur-Fowl, and report it as breeding in great numbers between 1,000 and 3,000 feet, frequenting thick cover either in evergreen, deciduous or bamboo-forest. Apparently the Travancore bird is seldom found in scrub-jungle, but it is said to be very fond of the cover of the Lantana bush in the mornings and evenings, when it feeds on the berries, occasionally making its nest under the dense protection afforded by it.

The nest differs in no way from that of the preceding bird, the hen sitting quite as close, and Bourdillon says he has known her sit until actually seized, just as Hume records two instances of the typical form being caught on the nest.

The breeding season is very regular and extends from January to the end of March or early April. A few birds may breed again in September and October, as Bourdillon took two fresh eggs on the 6th of the former month.

The eggs are indistinguishable from those of the preceding bird, though they average both bigger and a trifle paler.

Thirty-six eggs average 41.3×30.4 mm. : maxima 42.3×31.0 and 40.8×31.3 mm. ; minima 38.1×29.2 and 39.0×28.7 mm.

(1942) *Galloperdix spadicea caurina* Blanford.

THE ARAVALI RED SPUR-FOWL.

Galloperdix spadicea caurina, Fauna B. I., Birds, 2nd ed. vol. v, p. 361.

This race of Spur-Fowl has a very restricted range, so far having been obtained only in the Aravali Hills and Udaipur.

Except that it breeds in somewhat thinner bush and jungle than the other subspecies do there is nothing to note about the country it prefers.

Butler, as quoted by Hume, writes :—"The Red Spur-fowl is common all along the Aravalis. It is usually found singly or in pairs, and breeds like the last species during the hot weather. I have never seen the nest, but have often seen the chicks with the old birds shortly after they have been hatched in May and June."

Dr. King also writes to me from Aboo :—"This species is common at Aboo in the valleys, ranging as high as 4,000 feet, but is most plentiful from about 1,500 feet to 3,000 feet above the sea. It

prefers dense jungle and nullahs in which there is a thick undergrowth and especially where there is much bamboo.

"I never took the nest myself, but its eggs were brought to me in the early part of May, and my Shikari and the Bheels employed said that the nests were flat and shallow, composed of dry bamboo-leaves placed under, or even in the middle of, clumps of bamboo, in the deeper valleys."

A pair of eggs in the Hume collection measure 46.2×32.0 and 44.7×31.5 mm., while three in my own collection taken by Mr. Vidal measure 35.8×27.0 , 35.6×26.6 and 36.5×26.4 mm. These will certainly prove to be very small eggs when we once know the average of a number, while Hume's may be exceptionally big.

(1943) *Galloperdix lunulata* (Valenc.).

THE PAINTED SPUR-FOWL.

Galloperdix lunulata, Fauna B. I., Birds, 2nd ed. vol. v, p. 362.

The range of this Spur-Fowl is very much the same as that of the true Red Spur-Fowl. In the North its limits may be roughly defined as the Sind, Jumna and Ganges Rivers; West it is found as far as the coastal hill-ranges and throughout Coimbatore and Mysore. It does not occur on the Malabar coast or in Western Travancore. On the East it extends to the coast of Orissa and Madras wherever the country is suitable.

This Spur-Fowl does not seem to mind much what kind of country it breeds in provided there is ample cover of some kind and the ground broken and rocky.

There is very little recorded about the breeding of this bird. Blewitt writes:—"It breeds certainly from March to May" (Raipore), "making a slight excavation in the ground for the eggs, under shelter of a boulder or rock in a thicket. Some time in April 1871, from such a nest, made at the base of a large boulder in dense jungle, the eggshells were taken from which the chicks had escaped; again in the same month, under the ledge of a rock in thick undergrowth in a slight hollow in the earth, two fresh eggs were found.

"Apparently five is the maximum number of eggs. At least during two seasons, of the many broods met with, no single brood of chicks exceeded this number."

Hume also notes that Thompson took a nest in Chanda on the 5th April and Tickell a second in June.

It does not breed at any great elevation, probably very seldom over 3,000 feet and generally under 2,000 feet.

Pitman found them extraordinarily common in the Central Provinces on the rocky hills of granatoid gneiss, which were covered with forest, bamboo- and thorn-jungle, and noticed that they preferred the crests of these ridges, covered quite thinly with grass and hush,

rather than the more heavily forested lower slopes. This penchant for boulders and rocks, both for living and for breeding among, seems constant, and many of my correspondents refer to rocks affording protection to the nests they have found.

In the Nilgiris they are very common in the sholas and other small woods up to about 2,000 feet, and I have clutches taken by Vidal, Howard Campbell and F. E. Kemp taken from February to May and a clutch of two taken by Col. H. R. Baker in the Eastern Ghats on the 18th June.

We still want more information about the breeding time, but presumably, over most of its area, February to early May is the normal season, a few birds laying in January and a few others in June.

The eggs are just like those of the other species, but pale-coloured eggs are more numerous in proportion and the range of variation wider.

Twenty-five eggs average 40.9×29.3 mm.: maxima 42.4×28.4 and 42.0×31.0 mm.; minima 39.7×28.3 and 41.2×27.0 mm.

I know nothing of its general breeding habits beyond Blewitt's note to the effect that "the parent birds assiduously care for their young and when disturbed exhibit great anxiety for their safety. When closely pursued, the old birds endeavour by many artifices to draw the attention of the intruders from the spot where the chicks lie concealed, and invariably on the cry of a chick, wounded or captured, the parent birds daringly return to the rescue, often to within a dozen yards or so of the sportsmen. The chicks are very soon able to fly as well and as fast as the old birds."

(1944) *Galloperdix bicalcarata* (Forst.).

THE CEYLON SPUR-FOWL.

Galloperdix bicalcarata, Fauna B. I., Birds, 2nd ed. vol. v, p. 363.

This Spur-Fowl is confined to Ceylon, where it is found throughout the well-forested areas with a good rainfall. It is common in the South-Western portion of the island, almost equally so in the West and East, but does not occur in the drier areas of the North-West and North-East.

Legge says it "frequents tangled brakes, thickets in damp forests near rivers, jungle over hill-sides, and in fact any kind of cover which will afford it entire concealment."

It occurs from the foot-hills up to some 4,500 or 5,000 feet, and in some places extends a certain distance into the plains.

The breeding habits are much the same as those of other Spur-Fowls. Legge wrote to Hume informing him that "The nesting season of *G. bicalcaratus* would seem to extend over a considerable period, as I have had fledged young brought to me at the latter end

of May and have taken the eggs myself on the 7th July in the same district, the Southern Province.

"The nest is situated in the forest or in thick jungle under the shelter of a rock or near the projecting root of a large tree. It is merely a slight hollow scraped in the ground, with one or two dead leaves in the bottom to serve as a lining. I am unable to state what the average number of eggs in a clutch is."

The breeding season is evidently very prolonged as, in addition to what is recorded above, Hart found eggs in February, May and October, Jenkins took eggs for me in March and June, while Wait says that the breeding season appears to be from November to March and occasionally again in July and August.

The number of eggs laid is two or three, generally the former and perhaps, very exceptionally, four. Legge had only two eggs brought to him, but the natives told him they laid up to four. Hart says they lay four to six eggs but does not say he ever found that number, and Wait also says that usually only two eggs are laid. They agree well with the eggs of other Spur-Fowl, and eighteen eggs measured by myself average 40.6×29.7 mm., but Wait gives the average as 40.0×29.0 mm. The biggest eggs in my own series measure only 42.1×30.4 and 39.0×33.0 mm.; minima 38.0×28.4 and 39.4×28.3 mm.

Bambusicola fytchli.

THE BAMBOO-PARTRIDGE.

(1945) *Bambusicola fytchli fytchii* Anderson.

THE YUNNAN BAMBOO-PARTRIDGE.

Bambusicola fytchii fytchii, Fauna B. I., Birds, 2nd ed. vol. v, p. 365.

This Bamboo-Partridge, which was named from Yunnan specimens, ranges into Szechuan on the North-East and into the Kachin Hills and the North and South Shan States on the South and West.

Forrest found this bird common in Yunnan "in forests and thickets" between 6,000 and 10,000 feet, but Anderson first obtained it in the dense secondary growth of old rice clearings at about 3,000 feet.

Harrington, Hopwood, Livesey, Mackenzie and Grant have all taken the eggs of this bird, generally between 2,000 and 5,000 feet and nearly always in thick cover, though this varies greatly in character. It may be evergreen forest, bamboo-jungle, thick secondary growth or dense scrub. It seems to keep almost exclusively to heavy cover when breeding, and I have no records of its nesting in high grass-land as the Assam bird so often does. Hopwood took the eggs in bamboo-jungle and also in forest, while I received some eggs from the Ruby Mines district said to have been taken from secondary growth in deserted cultivation.

The breeding season is apparently a late one, and I have eggs dated from the 22nd May to the 20th July.

The normal clutch so far as we know at present is four to six, and I have not heard of a larger clutch.

The eggs are in shape an oval, the smaller end well defined and sometimes pointed. The texture is extraordinarily close, hard and fine, while the shell is as thick as that of the egg of a Guinea-Fowl and much stronger than that of the Jungle-Fowl.

The colour varies from a creamy-buff to a warm buff, quite spotless, and generally rather deep in tint.

Thirty-six eggs average 39.1×29.7 mm. : maxima 41.0×30.0 and 38.3×30.7 mm. ; minima 36.1×29.1 and 37.0×27.8 mm.

Nothing further is recorded of their breeding habits, but these will certainly be practically the same as those of the better known Assam bird.

(1946) *Bambusicola fytchii hopkinsoni* Godw.-Aust.

THE ASSAM BAMBOO-PARTRIDGE.

Bambusicola fytchii hopkinsoni, Fauna B. I., Birds, 2nd ed. vol. v, p. 366.

In Assam this is the most common of all Game-Birds, extending from Cachar and Sylhet, through the Patkoi Range, to Lakhimpur, South of the Brahmapootra. It is equally plentiful in the Chin Hills and extends to the Arakan Yomas. Where this bird meets the last is not yet known, but probably it does not extend beyond the Chin Hills East.

It may be found in any kind of country from a little over 1,000 feet up to 5,000 feet, but its favourite resorts are hillsides, steep or nearly sloping, covered with long sun-grass and with forest, scrub- or bamboo-jungle close alongside. If there is a stream running along the bottom of the hill so much the better, while the grass they prefer is from 2 to 3 feet high, though I have found them in long rank growths over 5 feet. They do not seem to like the vast expanses of sun-grass land beloved by the Black and Painted Partridges, nor, on the other hand, do they wander into the interior of Pine- or evergreen forests, though they may be found at the edges of them and, rarely, nests may be taken in Pine-forest in ravines at the edge of it.

In the Naga Hills they ascend higher than in Cachar, and J. P. Mills took nests at about 7,000 feet near Kohima, while in Lakhimpur they are found in the plains next the hills at about 700 feet.

The nest may be placed in scrub, bamboo-jungle, secondary growth or in sun-grass but, if the latter, it is generally close to cover of some kind. Sometimes a natural hollow is selected, occasionally the birds scratch one out for themselves but, often, the eggs are laid on a pile of dead leaves with no hollow at all. I have never seen

eggs laid on bare ground or on short grass and, generally, a good pile of dead leaves is collected or selected to receive the eggs. If the eggs are laid in grass-land the birds usually choose a rather high patch where the old blades, roots and fallen scraps form a well-hidden, soft and sufficient bed but, when laid in bamboo-jungle, they are often deposited on the fallen leaves in the open without any attempt at concealment. I once came across such a clutch of eggs and, though the bird scurried away from only a few feet distant, it took me a long time to find them, they so exactly matched the dead yellow bamboo-leaves all round them.

The birds breed generally in the end of March, April and May, but many also breed in June, and I have taken eggs as late as September and as early as the first week in March.

The full clutch of eggs is four or five, most often the latter, and I have found three eggs hard-set or as many as seven fresh, though this number is exceptional.

The eggs, of course, are indistinguishable from those of the preceding subspecies and, like them, are among the hardest-shelled birds' eggs I have seen. The variation in depth of colour is very slight, excessively pale or deep-coloured eggs being very rare.

Two hundred eggs average 40.2×29.6 mm. : maxima 41.8×29.9 and 40.8×31.9 mm. ; minima 36.4×27.9 and 38.5×27.0 mm.

Pigmy eggs are very common and I have seen at least twenty of them, once two occurring in the same clutch of five eggs.

This Partridge is monogamous and, I think, pairs for life, each pair having a definite small area which they occupy, while the coveys met with are, I think, always composed of just the parents and their last batch of young. The male takes as much interest in the chicks as the female does, though he does not help in incubation. The female carries this on alone and sits very close, flustering off the eggs when she is almost trodden on, even when she has ample warning to allow her to get away unnoticed.

In the breeding season the male is very pugilistic, and utters his ringing challenge morning, noon and evening, but I have never seen either the full display or a fight.

(1947) *Rollulus roulroul* (Scop.).

THE CRESTED WOOD-PARTRIDGE.

Rollulus roulroul, Fauna B. I., Birds, 2nd ed. vol. v, p. 368.

The Crested Wood-Partridge occurs in Tenasserim, South-West peninsular Siam, the Malay States, Sumatra and Borneo. Its status in Java is doubtful.

Very little is recorded about this bird, which frequents deep forest. Its nest has never been found, but a captive bird in Inglis's aviaries

in Bihar laid four eggs, the last on 25th April, of which he kindly gave me one. It is pure white, of close, fine texture and a fairly glossy surface, while in shape it is pyriform-oval, and measures 36.0×28.0 mm.

Excalfactoria chinensis.

THE BLUE-BREASTED QUAIL.

(1948) *Excalfactoria chinensis chinensis* (Linn.).

THE CHINESE BLUE-BREASTED QUAIL.

Excalfactoria chinensis chinensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 369.

This beautiful little Quail has a very wide range, extending practically over the whole of Ceylon, India and Burma. It is a common breeding bird on the South-West coast from Bombay to Travancore, equally common in Orissa, Bengal, Bihar and Assam. It is rare in Madras and South-East India and does not occur in North-West India North-West of a line drawn roughly from about Bombay City to Simla.

Outside India it ranges East through the Indo-Chinese countries to China and Formosa and South into the Malay Peninsula.

This is a Quail of grass-lands, and I gave the following full description of its haunts in 1923 (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 6, 1923), where I wrote:—"There are two essentials for the country they reside in; first ample water and, secondly, cover of the sort they prefer, i. e., thin grass or reeds, sungrass three or four feet high, or fairly thin scrub or bush-jungle. If there is heavier forest or jungle close by, so much the better, but they only seek safety in this when in danger. We also found them in Cachar and Sylhet in the dense ekra and elephant-grass bordering the endless swamps in these districts, but they came out of the heavy reeds in the mornings and evenings to feed in the thinner grass alongside them, retiring once more during the heat of the day into their cool shade. In the Winter and Spring as these swamps dry up the birds move with them, deserting those which are entirely dry for those in which some water still remains, whilst throughout the year they may be found in bush or grass cover on the sides of streams and water-courses. In the hills where there were but few swamps they were quite content with the grass-lands through which a stream or two found their way and, in North Cachar, I have often put them up in the dense secondary growth which grows up in deserted cultivation. They were also to be found in standing crops of hill-rice, millet etc. and in sugar-cane."

There is very little said about this Quail in Hume's 'Nests and Eggs,' but I have seen many dozens of nests in Assam. I have found them in the plains and in the hills up to 5,000 feet, while

Tytler took eggs in Kohima at 7,000 feet, which is probably about as high as they breed.

The nest is very primitive, just a hollow, either natural or scraped out by the birds in the soil, and either lined with a few leaves or a little grass. Sometimes, however, I have seen the eggs deposited on the bare earth, although leaves and oddments lay all round the scrape, some even just turned out of this by the birds themselves.

Oates says of a nest found by him in Pegu that it "was a mere pad of grass, placed in a clump of coarse grass." In the Malay Peninsula Davison, who found eggs in March, says that the "nest, always on the ground, usually in the midst of low, short grass, though always close to thicker cover, is a mere depression in the soil, more or less thinly lined with blades and fine stems of grass."

The breeding season seems very indefinite. In Assam the principal months for eggs are June to August, but I have taken them at odd times throughout the year. In Southern India it breeds mostly from March to April and in Ceylon, according to Legge, in May, while Phillips took a clutch of four eggs in September. In Burma I have records of eggs taken in January, May and July, while in the Malay Peninsula they have been taken from January to March.

The usual clutch is five to seven, occasionally only four and equally rarely eight. In shape they are broad ovals, generally well pointed at the smaller end and, sometimes, almost peg-top-shaped. The texture is very hard, fine and close, the surface often highly glossed and the shell strong.

In colour they vary greatly from a pale grey or green drab, a pale olive-yellow or olive clay-colour to a rich deep sienna-brown. Many eggs have a stippling of tiny black marks, usually mere specks, rarely tiny blotches. These are sparsely, often very sparsely, distributed equally over the whole egg; occasionally they are fairly numerous and show up well.

One hundred eggs average 24.5×19.0 mm. : maxima 27.7×18.5 and 25.3×20.4 mm. ; minima 22.9×17.3 mm.

The female alone, so far as I know, carries on incubation, but the male is always to be found near the nest and is certainly monogamous, being a very good father to the chicks.

Hume thought that this bird was more or less migratory, and Oates speaks of immense "numbers appearing in Pegu about the 1st May, while the sexes arrive in separate flocks." Hume says that they are only monsoon visitors to Assam, but this is not so, and they are to be found all the year round if one knows where to look for them.

Coturnix coturnix.**THE GREY QUAIL.****(1950) *Coturnix coturnix coturnix* (Linn.).****THE COMMON GREY QUAIL.***Coturnix coturnix coturnix*, Fauna B. I., Birds, 2nd ed. vol. v, p. 372.

The Common Quail breeds in considerable numbers in North-West India, breeding birds having been recorded as far East as Purnea, Mymensingh and Manipur and as far South as Sattara in the Bombay Presidency and Hoshangabad in the Central Provinces. Outside India its breeding range covers most of Central and Southern Europe and Asia East to Lake Baikal, Afghanistan and Persia.

Compared with the many millions of Quail which visit India in the Winter our resident birds are but few in number, yet records of their breeding are numerous, and in a few places they are almost common during the breeding season. Up to a comparatively recent date this Quail was accepted as a Winter visitor only, and when eggs were found they were invariably said to be those of the Black-breasted Quail.

In Hume's time he himself had taken a single clutch of eggs in Purnea, Marshall (C. N. T.) found one in Lahore, Blewitt another near Hansi, Marshall (G. F. L.) saw one at Allahabad, and Cock reported it as "breeding most abundantly about Nowshera in April, while Biddulph said it also bred at Gilgit. Now they are known to breed freely in the Deccan, Central Provinces, United Provinces, Western Bengal and over much of the Punjab and Frontier Provinces. The numbers, however, which breed in any one locality differ greatly from year to year, probably influenced by food and weather conditions.

In Kashmir Osmaston found it in many places, as did Ward, and several other collectors in yet different localities, so that it undoubtedly breeds over a wide area.

It constantly breeds up to 8,000 and 9,000 feet, while heat has no terrors for it. Betham found it breeding in Ferozepore in March, Lindsey Smith in Lyallpur in May, and it has been found breeding in the hottest parts of the Punjab in the hottest months of May to July.

The nest of course in India is just what it is in Europe and elsewhere, a mere scratching in the soil; sometimes there may be a leaf or two in the hollow or a few scraps of grass, though often these are only accidental; at other times quite a compact pad of leaves and grass is gathered together by the hen bird as a bed for her eggs.

Sometimes the nest is placed in open grass country, cultivated land of any kind with crops on it or lying fallow, and sometimes in the thin grass patches between the fields. Often they are laid

in fields of growing corn, millet or other cereals, though most birds seem to prefer green grass-lands or crops which are young and green. Wherever the nest may be, it has often been noticed that it is placed near some tall bush or other landmark which may serve as a guide to the nest.

The two months during which most eggs are laid in India are March and April, and in these two months eggs have been taken by Hume (Purnea); Marshall (Lahore); Cock (Nowshera); Lindsey Smith (Multan and Lyallpur); Betham (Ferozepore); Jesse (Lucknow). Many birds, however, breed quite late after the rains break. Jennings obtained them in the Central Provinces in September, while in Kashmir Osmaston obtained nearly all his eggs in August. They have also been often taken in April and early May, as by Lindsey Smith in Lyallpur, in Gilgit by Biddulph, and in Kashmir by Ward.

The number of eggs in a clutch varies greatly. Lindsey Smith sent me two clutches, one of three and one of four eggs only, both of which were much incubated. Clutches of six to eight are common, of nine to eleven not very rare, while I have two of thirteen. Ludlow also took a clutch of thirteen in Turkestan in June near the Koh-Terek-Tekkes junction.

The eggs vary very greatly and, though intermediate eggs occur, there are the following very definite types:—

- (1) Ground-colour rather a deep yellow-brown or reddish-brown covered all over with minute specks of dark blackish-brown with here and there a few rather larger blotches of the same colour.
- (2) Ground-colour a pale creamy white with blotches of almost black everywhere, in some very numerous but not very big, in others bigger and less numerous, and in some very big and scanty.
- (3) Similar to (2) but with the ground a warmer buff and the great blotches a rich chestnut.
- (4) Ground-colour pale yellowish or stone-colour with scanty freckles and specks and large blotches of pale reddish.
- (5) Ground creamy, yellowish or pale buff with mottlings of liver-brown, or with large blotches of the same running into one another.

As a rule all the eggs in a clutch are the same in type, but I have one or two clutches which contain some eggs of two types and others intermediate.

The texture is hard, fine and close, the surface smooth and often highly glossed. The shape varies from broad oval to an almost peg-top.

One hundred Indian eggs average 29.7×22.8 mm.: maxima 33.0×23.6 and 32.0×25.0 mm.; minima 27.1×19.1 mm.

We have no notes on incubation in India, but of the European bird Witherby says that the female alone incubates and that the period of incubation varies from sixteen to twenty-one days, a very remarkable degree of variation recorded from observations of birds in captivity.

They sit very close and sometimes allow themselves to be caught on the nest. Donald speaks of actually treading on one bird, while Hume also caught one on the nest, and replaced her, when she continued to sit on her just-hatching eggs without attempting to fly away.

It is said to be single-brooded, but in India some pairs may breed twice.

It is almost certainly monogamous.

(1952) *Coturnix coromandelica* (Gmelin).

THE BLACK-BREASTED OR RAIN-QUAIL.

Coturnix coromandelica, Fauna B. I., Birds, 2nd ed. vol. v, p. 375.

The Rain-Quail occurs in Ceylon, though Wait says it is rare, and practically over the whole of India and Burma as far East as the Shan States. It ascends the mountains to some height, as Dodsworth obtained a specimen near Simla at about 7,000 feet, and it has been seen as high as this in the Nilgiris. It is generally believed to be locally migratory, occurring in the wetter parts of the country in the dry season and moving to the drier areas when the rains commence. It is, however, doubtful to what extent these local migrations are not merely a change of the birds' haunts during the two seasons rather than an actual movement from one district to another.

In the Punjab during the dry season only casual birds have been observed, and the same is said to be the case in Cutch, Sind, Katiawar, the United Provinces and Rajputana.

In Bihar and Bengal they are certainly to be found all the year round but, in the very hot months, they keep much under cover such as reeds, long grass, bush and even tree-jungle and shady Mango-orchards.

Davidson says of the Deccan :—"The Rain-Quail is very common and is a permanent resident, though it wanders about a good deal in search of water, food and shelter. Thus while in November and December this Quail will be found scattered about singly or in pairs everywhere, in the hot weather hundreds will be found collected in a few nullahs and gardens."

They breed in much the same kind of ground as the Common Grey Quail but in much greater numbers in certain favoured localities, such as the Deccan (Davidson and Wenden) and Sholapur (Davidson). Like that bird they often nest in standing crops of grain, such as millet, *bagra*, *jowari*, sometimes when it is very

thick and high and, even when they breed quite in the open or in fallow land, they seem nearly always to nest under the shelter of a bush or some other kind of protection. The nest is the same kind of scrape as that used by *Coturnix coturnix* and sometimes has a good lining and sometimes none at all.

In Sind and in the Rann of Cutch this Quail seems to breed early in April and May. Betham received a clutch of nine eggs from Knowsley taken in Jacobabad in April, and Gordon also took eggs in this district, while Bell took several nests in the Kelishar forest in pease-fields in the end of March and in April, while Bulkley told me he had taken several nests "from the desert in Cutch where there was a growth of grass." Eates has also taken nests in several places in Sind, all in March, April and May.

Elsewhere August and September are the two normal breeding months. In Sholapur Davidson and Wenden took eggs from the 4th August to the 25th September. They also took eggs at Sholapur in October, and the former says:—"I have found them breeding in the Deccan from the first week in August till late in November." In Belgaum Butler took eggs in August and at Deesa in August and September; in Bihar and Bengal many people have taken eggs from July to September; while, finally, Williams, T. R. O'Donnell and Betham have taken big series in August and September.

In Cachar I once found eggs just hatching on the 15th April, but normally, in this district, they do not breed until after the rains break.

The number of eggs laid is generally six to eight, but four only are often incubated and larger clutches, up to ten and eleven, are not rare. Butler took a nest with eleven eggs at Belgaum and Davidson found one of eleven and one of eighteen at Sholapur, the latter probably the produce of two hens.

The eggs go through all the variations shown by those of the Common Grey Quail, but I have one curious clutch the ground of which is practically white speckled lightly with tiny pin-point dots of black and light red all over the surface but rather more numerous at the larger end.

One hundred and fifty eggs average 27.4×20.8 mm. : maxima 30.8×21.7 and 30.7×22.2 mm. ; minima 25.5×20.8 and 26.9×19.2 mm.

In their domestic arrangements the Rain-Quails differ little from the Common Quail. The male is monogamous and, though he does not incubate, he stays close to the female when she is sitting and, if he wanders away a short distance, calls constantly to her to let her know where he is.

The hen sits very close and will not move until almost touched; when the chicks are hatched both parents look after them, and within a very few days the young can fly almost as fast as the old birds.

Perdica asiatica.**THE BUSH-QUAIL.**(1953) ***Perdica asiatica asiatica* (Lath.).****THE JUNGLE BUSH-QUAIL.***Perdica asiatica asiatica*, Fauna B. I., Birds, 2nd ed. vol. v, p. 377.

I can add nothing to the distribution as given in the 'Fauna,' and the bird breeds and is resident wherever found. It occurs "in well-wooded localities from the Himalayas to Ceylon. In the Outer Himalayas it ranges up to 4,000 feet and in the hills of Southern India up to about 3,500 feet. In Kashmir it has been obtained at 5,000 feet. It has not been found in Sind, but is common in parts of Jodhpore and Rajputana, extending thence along the Western coast to Ceylon; it is common in the Deccan to the South and East of the North-West Provinces and extends East to Bihar, Western Bengal and Orissa. In Bengal it has been reported to me from Dacca, while Rainey thought he saw it in the Sunderbands, but I doubt if either of these reports can be relied on. It is common in Chota Nagpur and not rare in Gya, the Midnapur and Rajmehal Hills, is occasionally seen in Suri and the Santhal Parganas and, even more rarely, in the hilly portions of Bankura.

They make their nest in any kind of cover which is thick enough to afford good protection yet is not too dense and moist. Occasionally they may frequent deep evergreen forest for breeding purposes, though this is exceptional, and they prefer scrub, bush, deciduous forest, standing crops or grass-land.

Tickell describes the kind of country they haunt as "stony, gravelly places among thorny bushes, such as the jujube or ber, or tracts of stunted Sâl, Assun and Polas (or Dhak)."

The nest, for a Game-bird's, is a quite well put together little pad of grass and grass-roots, measuring 4 or 5 inches in diameter, with a depression in the centre, for the eggs, about 2 to 3 inches across by an inch or so deep. It is placed under the protection of a bush, extra thick tuft of grass, or in long grass, weeds etc. high enough to screen it from the sun and from the view of passers-by.

Over most of its range it begins to breed after the rains have well broken and insect-food is very abundant. Eggs are laid from about the middle of August to the end of the cold weather, the great majority being laid between the end of August and the end of October. In the Deccan they breed from October to February and occasionally in March, while in Orissa, Bengal and Bihar most birds seem to lay in March and April. In Travancore Stewart found them breeding from January to March, most eggs being laid in February.

A full clutch of eggs may be anything from four to eight but is most often five or six. The texture is fine and close, the shell

strong and the surface smooth with slight gloss, while the shape varies from true to pointed oval.

In colour they vary from a creamy buff, so pale that it looks white unless contrasted with really white eggs, to a pale *café-au-lait* or pale buff, very rarely of any depth in tint.

One hundred and forty eggs average 25.4×19.5 mm. : maxima 29.0×21.3 and 28.3×22.0 mm. ; minima 24.1×19.3 and 24.2×18.4 mm.

The female alone incubates and in India incubation takes sixteen days, but Mr. N. F. Cockerill found that in captivity it took eighteen days (*Avi. Mag.* vii, p. 234, 1909). They are very close sitters in a wild state, not leaving the nest until almost stamped on.

The male is almost certainly monogamous, though this has not been proved beyond all doubt.

(1954) *Pardicula asiatica argoondah* (Sykes).

THE ROCK BUSH-QUAIL.

Pardicula asiatica argoondah, Fauna B. I., Birds, 2nd ed. vol. v, p. 379.

The range of the Rock Bush-Quail constantly overlaps that of the Jungle Bush-Quail. Roughly it may be said to be South-East India from Madras to the extreme South, but not Ceylon, West it extends to some parts of the Punjab and to the United Provinces, Gujerat, Cutch, Rajputana, the Deccan, parts of the drier districts of the Bombay Presidency and the drier plains of Mysore and Travancore.

This species of Quail seems to vary according to the nature of its habitat in a most unusual manner and the two races are very frequently found within a short distance of one another. Hume explains this as follows :—"It avoids mountains, which it never ascends, forest and thick jungle, and eschews well watered and richly wooded or cultivated tracts ; it loves dry, open, sandy or even rocky plains or low hillocks sparsely studded with thorny bushes ; elevation is not of so much consequence to it as the openness and semi-waste character of the place. You will find it equally at home in the plains about Ajmere, at an elevation of 1,700 feet, and near sea-level in the Carnatic. Dry, barren, sparsely cultivated plains' districts are its choice, and hence it follows that, although when localities such as it affects inosculate with those that the Jungle Bush-Quail prefers, you may shoot both species in the same stubble, yet, broadly speaking, as Captain Butler remarks, where you find the Rock Bush-Quail, there, as a rule, you do not find the other species."

It seems especially fond of low rocky hills, and numerous writers refer to this. Sykes, who first discriminated between the Rock and Jungle Bush-Quail, says they "are found all over the Deccan on the general levels of the country, amidst rocks and low bushes."

Jerdon writes :—" It frequents rocky hills with low scrub-jungle and especially barren and uncultivated plains, scantily covered with low bushes of *Zizyphus* and *Carina*." Davidson records that " Its favourite resorts were the stony hillocks with a few scrubby bushes."

The nest is similar in all respects to that of the Jungle Bush-Quail, and, like that of that bird, is generally placed under the shade and protection of a tuft of grass, bush or rock.

The principal breeding season is from August to November while a good many birds also breed in March and April. Blewitt in Jhansi found them breeding in August and September; Davidson in the Panch Mahals took eggs " in the latter part of the rains, in Dulia in October and in Nassic in April "; Aitken in Berar gives November and December as the laying months, while Harrington Bulkley obtained eggs in Gujerat and Cutch from August to December; Sparrow took eggs from September to November near Trimulgherry and, finally, Betham found them breeding round Poona in great numbers from September to January. Probably it will be found to breed sometimes in every month of the year, though the two seasons mentioned are the favourite periods.

They lay from four to eight eggs, generally five or six, which cannot be distinguished from those of the preceding race.

One hundred eggs average 25.6×20.1 mm. : maxima 29.0×21.3 and 28.3×22.4 mm. ; minima 24.2×18.9 mm.

Its incubation, post-laying breeding habits etc. are just the same as those of the Jungle Bush-Quail and, like that bird, it is very pugnacious, the males fighting a great deal during the breeding season.

***Cryptoplectron erythrorhynchum*.**

THE PAINTED BUSH-QUAIL.

(1955) *Cryptoplectron erythrorhynchum erythrorhynchum* (Sykes).

THE SOUTHERN PAINTED BUSH-QUAIL.

Cryptoplectron erythrorhynchum erythrorhynchum, Fauna B. I., Birds, 2nd ed. vol. v, p. 381.

This pretty little Quail occurs in South-West India from about the latitude of Poona to Travancore in the extreme South, but does not occur in Ceylon. In India it only extends Eastwards to the various hill-ranges of Mysore, Nilgiris, Palni Hills, Cardamon Hills, the Wynnaad and throughout the Western Ghats. A label, " Madras," on a specimen in the British Museum probably refers to somewhere in the extreme Western Madras Presidency.

The Painted Bush-Quail breeds at all elevations throughout its range in suitable localities, and certainly ascends the mountain ranges as high as 6,000 feet. It breeds wherever the ground is broken up

into low foot-hills and ravines. It is common in the plateaux at 2,000 feet, when these are not too flat or too densely covered with forest, but it is not found in the true plains districts. It likes best thin scrub, light deciduous forest with scanty bush and grass undergrowth but, above all, it prefers cultivated country with patches here and there of scrub and hush and others again of open waste land.

In Nelliampathy Kinloch said that he found it extremely common at 4,700 feet round the edges of almost every "shola," especially in the Lily Valley. Here they were so tame that they would approach within a few feet of him if he kept quiet and still.

The nest is a mere scratching in the stony soil, rarely with a lining of grass and leaves, often with no lining at all. It is generally placed in open waste land under the shelter of some tuft of grass, small bush or a rock, boulder, stone or clod of earth. It is never placed in really thick cover, whether bush or forest, but it is, on the other hand, often placed right out in the open without protection of any kind.

The birds probably have two fairly definite breeding seasons, the first from early March to late April, before the rains commence, and August and September after the rains have well set in. In the Nilgiris Miss Cockburn found, or had brought to her, eggs in January, February, March, September and October, while Darling obtained them in these hills and in the Wynad from August to November, and I have a clutch taken in June. In Travancore Bourdillon obtained eggs in January, February, July to September and again in December. Possibly many birds breed twice.

The number of eggs laid in a clutch is generally, I believe, four to six and very rarely seven or more. Miss Cockburn says that they lay from ten to fourteen, but much of her information is founded on native reports, though Darling, also, said he obtained as many as ten.

The eggs only differ from those of *Perdica* in their larger size.

Fifty eggs average 31.0×23.0 mm.; maxima 34.3×24.0 and 31.1×24.3 mm.; minima 27.6×22.5 and 27.9×21.5 mm.

The female alone carries on incubation and sits very close, but the male is generally somewhere near the nest while she is sitting, and certainly helps her to look after the chicks when hatched, so is therefore probably monogamous.

(1956) *Cryptoplectron erythrorhynchum blewitti* (Hume).

THE NORTHERN PAINTED BUSH-QUAIL.

Cryptoplectron erythrorhynchum blewitti, Fauna B. I., Birds, 2nd ed. vol. v, p. 382.

This race of the Painted Bush-Quail is found in the Central Provinces, North and East of the preceding subspecies, having

been obtained in Manda, Balaghat, Seoni, Chantipur, Raipur, Sironcha and Bastar; it also occurs in the South-East of the Sambalpur district and thence North-East to Manbhum, Singhbhum, Ranchi and Hazaribagh. In Bastar it ascends up to 3,600 feet and in Chota Nagpore up to some 2,500 feet, and I met with it in Ranchi and Hazaribagh on the highest hills.

Blewitt says that it haunts "forest tracts, and scrub-jungle bordering the various low hill-ranges in the districts of Raipur and Bhandara," and I found it in similar country in Chota Nagpore.

Thompson says that the breeding season begins in June and July shortly after the setting in of the rainy season.

The only eggs I know of are a clutch of three taken in Chanda on the 31st August. They are, of course, just like the eggs of the typical form and measure: 30.5×24.0 , 30.0×23.0 and 30.0×23.4 mm.

The eggs were reported to me as having been taken from a scratching in the soil in thin Sâl-tree and scrub-jungle.

Cryptoplectron manipurensis.

THE MANIPUR BUSH-QUAIL.

(1957) *Cryptoplectron manipurensis manipurensis* (Hume).

THE MANIPUR BUSH-QUAIL.

Cryptoplectron manipurensis manipurensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 383.

This little Bush-Quail is restricted to the hills South of the Brahmapootra Valley in Cachar, Sylhet, Naga and Khasia Hills and Manipur.

Little is known about the haunts and breeding of this Quail, but it is not rare when one knows where to look for it. Higgins says that "they are to be found anywhere in the Manipur Valley where there is long grass and water, but almost exclusively round the edge of the valley, near the hills, and away from the populous part of the country."

Woods (Journ. As. Soc. Beng. vol. xlviii, p. 110, 1899, Manipur) writes:—"It is by no means such a rare bird as Hume thinks. They keep to very dense jungle composed entirely of sun- and elephant-grass. I found them in greatest abundance in jungles adjoining nullahs in which there was a certain amount of water,—in fact they are always found close to water."

I obtained one nest of this bird in the Leri-Baladhan plateau on the borders of Manipur-Cachar Hills. The ground was a rolling grass-covered hill a few hundred feet elevation only. On the summit the grass was short, but in the nullahs between the hills very rank and long, while all round grew evergreen forest. Passing

through a patch of thin short grass I put up one of these Quails, shot it, and then discovered the nest with four almost white eggs, probably unusually pale. They were in a hollow scratched among the roots of the grass with a few oddments of leaves and grass lying in it. The eggs are exactly like very pale eggs of *Perdicula* and of *Cyrtoplecton erythrorhynchum*, measuring 30.4×24.1 , 31.2×23.5 , 31.2×24.0 and 29.3×24.9 mm.

These were taken on the 13th May.

Major Woods's description of the breeding is wrong, due to his having mistaken a nest of one of the Bustard-Quails for that of this bird.

Arborophila torqueola.

THE COMMON HILL-PARTRIDGE.

(1959) *Arborophila torqueola torqueola* (Valenc.).

THE ASSAM COMMON HILL-PARTRIDGE.

Arborophila torqueola torqueola, Fauna B. I., Birds, 2nd ed. vol. v, p. 386.

This little Wood-Partridge, which was described from a Bengal (?) bird, extends from Garhwal and Kumaon to the extreme East of Assam, being found in the Himalayas between 5,000 and 10,000 feet and, occasionally, some 4,000 feet higher, as Stoliczka records it at this elevation. South of the Brahmapootra it occurs on the higher ranges of the Naga Hills and on the highest hills North of Manipur and North Cachar. Rothschild also refers to this race specimens obtained in Yunnan by Forrest.

I doubt if *torqueola* ever breeds below 5,000 feet and generally over 7,000, at which height Whympers obtained eggs in Garhwal. Osmaston found a nest in Chakrata at 9,000 feet, while Masson took another in Native Sikkim at about the same height or rather more. On the Singalila Ridge, however, Masson obtained three eggs for me which he says were taken at not less than 10,000 or more than 11,000 feet.

They are birds of dense evergreen forest, especially where this is much broken up by ravines, rocks etc. and at the same time has ample undergrowth, while if there is a hill torrent or stream running close by, so much the better. The undergrowth it prefers is bracken, fern, *Daphne* and the varied tangle of briars, bushes etc. which are to be found in most of the Himalayan forests. South of the Brahmapootra I sometimes found them in more open country. As elsewhere, they were found mostly in evergreen forest, but they often haunted grass glades, stretching back from the sides of streams, where they wandered about when feeding and alongside which they placed their nests. They also bred in the heavy forest on the Kohima range where grass-land and patches of forest alternated.

The nest varies considerably; sometimes it is not much more than a scrape with a poor lining of grass, or grass and leaves; at other times it is a regular matted pad of grass and occasionally is a really well made grass nest, the pad being raised at the sides and the long ends of the grass interwoven with the surrounding living grass so as to form a deep cup, but with an entrance at one side almost level with the ground. I have never seen a domed nest of this species such as is sometimes made by the *rufogularis* group, but I have seen comparatively very few nests, and it is quite possible they do sometimes build such.

The breeding season is from early in April to the end of June, birds at the lower elevations breeding at least a month earlier than those above 8,000 feet, at which height a few birds may lay in July.

The most usual number of eggs to find in a full clutch is four to six, but they sometimes lay more, and Osmaston took a clutch of nine in Chakrata of which six unfortunately were subsequently destroyed by a rat. On the other hand, I have once seen three eggs hard-set.

All the birds of this genus lay pure China-white eggs which are exactly alike, varying only in size to some extent. In shape they vary from oval to very pointed ovals, and most eggs are decidedly pointed. The shell is very strong, the texture fine and close, with a surface carrying a strong gloss and very smooth.

Sixty eggs average 40.6×31.9 mm.; maxima 44.2×33.6 and 43.8×34.0 mm.; minima 35.6×28.7 and 35.8×27.4 mm.

I know practically nothing of the habits of this particular species, but judging from the habits of the species I really know well I think there is no doubt that the male is monogamous. He is a good husband and may generally be found near the nest when the hen is incubating, though he does not share her labours.

(1960) *Arborophila torqueola millardi* Stuart Baker.

THE SIMLA HILL-PARTRIDGE.

Arborophila torqueola millardi, Fauna B. I., Birds, 2nd ed.-vol. v, p. 388.

This rather larger race of *torqueola* is found in the Simla States, extending thence into Chamba, Kulu and the Kangra Valley.

This Partridge apparently frequents much the same kind of country as the preceding bird and probably breeds between 5,000 and 10,000 feet.

The only note I can find on its breeding is that given by Whistler (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 849, 1919):—"A nest was recently obtained for me about 8,500 feet near Maharoo, Simla.

"It was first found on 25th April through the flushing of the parent birds but, although they had betrayed the approximate whereabouts of the nest, it was discovered only after a careful search;

there were then 7 eggs and on the 27th there were still only 7 eggs, but 8 were found on the next morning. When the place was again visited on the 2nd May it was found that another and last egg had been laid, making in all a clutch of nine. On each of these subsequent visits neither of the parents was seen and the eggs were invariably cold, yet from the placing of grass over the entrance-hole there was no doubt that the nest had not been deserted.

"Endeavours were made to snare a bird at the nest, but a first attempt with horse-hair nooses was unsuccessful; so on the 7th May a gut-noose was set and the nest visited a second time in the evening. There had been a bailstorm and hailstones were then lying thickly around; my correspondent on arriving at the nest was astonished to find it completely covered over with grass, and while he was looking at this and wondering at the reason, the bird suddenly bounced out and as it passed he made a lucky grab and caught it in mid-air in his hand; the broken gut-snare was then round its neck.

"The nest is described as a carefully scraped out hole in a bank; this hole measured $8\frac{1}{2}$ inches in diameter after the removal of the nest, which was built carefully of, and domed with, grass with an internal diameter of $6\frac{1}{2}$ inches. The actual site of the nest was fairly open, but only a few yards away started undergrowth of the type usually frequented by the Poora. Particular emphasis was placed on the fact that whenever the nest was visited the eggs were cold, and on the fact of concealing the entrance of the nest with grass whether the bird was sitting or not.

"The nine eggs measure 42.5 to 46.0 in length and 32.5 to 34.0 mm. in width; the average is 44.0×32.2 mm."

(1961) *Arborophila torqueola batemani* (Ogilvie-Grant).

THE KACHIN HILL-PARTRIDGE.

Arborophila torqueola batemani, Fauna B. I., Birds, 2nd ed. vol. v, p. 389.

The range of this subspecies extends from the Chin Hills, where it is very common, to the Kachin Hills, in which it is resident and breeds from about 3,000 feet up to at least 7,000 feet, and Mackenzie thinks even higher than this. A race of *torqueola* occurs in the Shan Hills and is probably the present one, but we have as yet no skins from that area.

I can find nothing recorded as to the haunts and breeding habits of this race. Mackenzie, Hopwood, Harington and others have met with it commonly in the Chin Hills, and from what they have personally told me it frequents much the same type of country as the other races.

Harington's collectors in the Chin Hills obtained two nests with eggs near Haka on the 24th April and 22nd May, 1910. Both these nests, each containing four eggs, were found in evergreen forest at a height approximately of 5,000 feet, the nests according to the collectors being mere scrapes in the ground filled with leaves and fallen rubbish.

The eight eggs average 39.8×29.3 mm. : maxima 41.5×30.5 mm.; minima 37.5×29.2 mm.

Arborophila rufogularis.

THE RUFOUS-THROATED HILL-PARTRIDGE.

(1962) *Arborophila rufogularis rufogularis* (Blyth).

THE SIKKIM RUFOUS-THROATED HILL-PARTRIDGE.

Arborophila rufogularis rufogularis, Fauna B. I., Birds, 2nd ed. vol. v, p. 390.

This Hill-Partridge occurs in the Outer Himalayas from Kuman and Garhwal to Assam East and North of the Brahmapootra.

It is found from quite low down up to some 6,000 feet regularly, while Beavan says that near Darjiling he got it at 8,000 feet, and Masson also got it almost as high as this in Sikkim. They frequent exactly the same kind of forest as the better known Arakan bird dealt with very fully later on, and it makes the same kind of nest, often a hollow filled with grass and leaves, sometimes a good nest of grass, well matted and intertwined, and sometimes a domed nest such as I describe under *intermedia*. Like that bird also it sometimes makes a regular tunnel through the grass to its nest, closed with the adjoining grass-blades when the bird is absent.

Stevens and Masson have taken its nest in rocky broken ground in evergreen forest in Sikkim; Primrose found its eggs laid in a nest made in Tea-cultivation, a very unusual site, as well as others in scrub-jungle and forest. It has also been reported as breeding in grass-land and in bamboo-jungle.

The breeding season is from April in the lower hills to the end of July in the higher ranges. Whympers took a clutch of three fresh eggs from forest below the Naini Tal brewery on the 14th July, but he says "the nest was so close to a path that I did not dare leave them as they were the first I had ever seen and were bound to have been detected."

Eight eggs have been recorded in a clutch, but I think four or five is the normal full number and, personally, I have never seen more than the latter number though I have seen three only well incubated.

The eggs are typical of the genus in every respect.

Twenty-nine eggs average 39.9×30.2 mm : maxima 42.2×29.2 and 40.2×31.8 mm. ; minima 37.2×30.0 and 38.4×26.9 mm.

(1963) *Arborophila rufogularis intermedia* (Blyth).

THE ARAKAN RUFOUS-THROATED HILL-PARTRIDGE.

Arborophila rufogularis intermedia, Fauna B. I., Birds, 2nd ed. vol. v, p. 391.

This Arakan subspecies ranges from Assam, South of the Brahmaputra and East of the Dibong, through Manipur, Lushai Hills and the Chittagong Hill Tracts to the Arakan Yomas, while East it extends through the Chin Hills to the Kachin Hills and the Yunnan Mountains (*A. r. eurooa*).

In the Assam Hills it was quite a common bird, breeding between 2,000 and 6,000 feet in almost any kind of forest or jungle. The favourite haunt is undoubtedly rather stunted forest between 3,000 and 4,000 feet where the trees are small, not too close, the undergrowth scanty rather than otherwise, and the open glades and banks of streams numerous. At the same time I have found nests or had them shown to me in dense evergreen forest with almost impenetrable undergrowth. Often they haunt bamboo-jungle or mixed bamboo and grass, while at other times they may be found breeding in secondary growth and in among the weeds and cotton-bushes in cultivated patches surrounded by forest.

As a rule they prefer to nest in grass or thin undergrowth in forests, and in Laisung they nested occasionally in beds of a large and very virulent stinging-nettle mixed with a little long grass.

The nest varies greatly. Of course it is always on the ground, but it may be just a collection of leaves and rubbish with a hollow scraped in the centre, a scrape in the ground, either roughly lined with leaves and grass or with a neat compact lining of well interwoven leaves and grass. At times also a still better home is furnished for the eggs, especially when the scrape is made in among the roots of grass, whether green or withered. A hollow is scraped out by the birds in among the roots where the grass grows fairly thickly; this is beautifully lined, and then the surrounding grass is cleverly interwoven with other stems and blades of grass so as to form sides all round the nest and a complete or semi-complete canopy over it. Not content with this, the female then forms a tunnel a few inches or a yard or more in length through the grass to the nest; sometimes this tunnel is a well constructed, well covered affair, but I have seen one which was really ridiculous, the grass being simply bent over here and there where it grew conveniently, and though, from the marks, the bird evidently went in and out of her nest by this path quite regularly, the tunnel could not have screened her from view in any way.

The scrapes vary from about 7 to 9 inches in diameter, the best nest-pads being about 6 inches across, while the interwoven grass forms a chamber about 9 to 12 inches in diameter by rather more in height.

The mouth of the tunnel seems to be generally closed by the birds with growing grass, to which a few extra bits may be added. When the bird is absent it is always closed but often also as she enters to sit she closes, or partially closes, the entrance behind her.

Sometimes the nest is entirely unconcealed and at other times it is well hidden in scrub or grass or occasionally by an overhanging rock or boulder.

The breeding season is a long one and I have taken eggs from the 4th April to the 3rd August, but most eggs are laid in May and June.

The normal clutch seems to be four to six and very seldom seven. The Nagas all say that the birds do not lay more than six and sometimes only three, and these men are such accurate observers of nature that I have no doubt they are correct.

One hundred and fifty eggs average 39.2×29.8 mm. : maxima 44.0×31.0 and 43.1×32.0 mm. ; minima 33.4×26.6 mm.

The male is monogamous and is a very good husband and father, but takes no share in incubation and only helps with the nest when this is of the chamber type, when he assists the female in pulling down and interweaving (matting together would be a more correct term) the grass of which the walls and roof are formed. A pair of birds bred in a ravine near my bungalow in Gunyong for four years. The first year some Nagas netted the bird and took the eggs, but on her release in the ravine she again laid in almost the same spot, bringing up her brood of four quite safely. She always laid four eggs, but one year she had two broods, and the whole ten birds kept together until the following year. Incubation in her case took twenty or twenty-one days and began with the laying of the third egg ; the male never sat, so far as I could ascertain, but was generally in the vicinity of the nest.

(1965) *Arborophila atrogularis* (Blyth).

THE WHITE-CREEKED HILL-PARTRIDGE.

Arborophila atrogularis, Fauna B. I., Birds, 2nd ed. vol. v, p. 393.

Nothing has been added to the range of this Partridge since the distribution was given in the 'Fauna':—"Assam, South of the Brahmapootra ; Daffa and Miri Hills, North of that river (Stevens, Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 724, 1915) ; Cachar, Sylhet, Tippera, Manipur and Chittagong ; South into Arakan and East into the Chin and Kachin Hills (Anderson, 'Birds of Yunnan,' vol. ii, p. 673, 1876). Whitehead obtained it in Myitkyina at 3,500 feet, and Bateman shot it at Kamdoun. Coltart and I found it very common in Lakhimpur, and I found it almost equally so in Sadiya."

This little Hill-Partridge occurs in the plains as well as in the hills, which it does not ascend much, if at all, over 5,000 feet, being much more common below than above 3,000 feet. In the plains I do not think it breeds further from the hills than the broken ground at their base.

Except that it is very often found breeding in bamboo-jungle, the haunts of this Partridge are much the same as those of the other species of the genus. In Lakhimpur Coltart and I found nests in quite thin open bamboo-jungle with here and there grass-growth in patches in which the birds nested. At the same time we also found them in the exceptionally dense wet undergrowth in the ever-green forest, broken up by ravines, torrents and great masses of rocks and boulders.

In the plains a few birds begin to lay in March and continue until the end of May, but in the hills few birds breed until the end of April and continue well into July.

The number of eggs laid is three to seven, either extreme exceptional, and the usual clutch is four or five.

One hundred eggs average 37.6×28.4 mm.: maxima 42.4×31.8 mm.; minima 32.4×26.2 mm.

I know of no unusual trait in this bird's habits. The male is certainly monogamous and helps to feed and tend to the chicks, but I do not think he ever incubates; though I once flushed one apparently from the nest itself, it was probably only close to it.

(1966) *Arborophila mandellii* Hume.

THE RED-BREASTED HILL-PARTRIDGE.

Arborophila mandellii, Fauna B. I., Birds, 2nd ed. vol. v, p. 395.

The Red-breasted Hill-Partridge extends from Sikkim and Bhutan to the hills of North-Eastern Assam. Bailey obtained it in the Upper Dibong Valley and Needham in the hills above Sadiya, which probably forms its extreme Eastern limit. So far as we know this bird occurs in Sikkim between 1,000 and 6,000 feet, but probably also much higher, as Masson found the birds above Darjiling at 7,000-9,000 feet, though he failed to procure nests and eggs..

The Arbors know the bird and say that it breeds in the Takin hills above Sadiya, which are roughly 8,000 to 10,000 feet, while a nest taken for me by D. Macdonald in Sikkim and sent to me with a ragged skin must have been taken at not less than 8,000 feet.

Stevens apparently obtained nests in Sikkim quite of the normal character but containing feathers of the birds, possibly only accidentally placed there. The nest found by Macdonald was described as a hollow filled with leaves and grass, under the shelter of a rock, in a very thick forest of Rhododendron and Oak; the whole place very wet and humid and much split up into ravines and cliffs. It was taken on the 3rd June, and contained four fresh eggs, which measure 45.0×34.8 , 42.5×33.0 , 44.1×35.0 and 44.1×35.0 mm. These may prove eventually to be above the average in size.

Nothing is recorded of its habits beyond its predilection for particularly rugged and difficult country.

Arborophila brunneopecta.**THE BROWN-BREASTED HILL-PARTRIDGE.**(1967) *Arborophila brunneopecta brunneopecta* (Tick.).**THE TENASSERIM BROWN-BREASTED HILL-PARTRIDGE.***Arborophila brunneopectus brunneopectus*, Fauna B. I., Birds, 2nd ed. vol. v, p. 396.

This Hill-Partridge, originally described from Tenasserim, is found in that district as far South as Tavoy, while North it extends through the Pegu Yomas into the Kachin and Karen Hills, the Southern Shan States and Yunnan and East into West and North-West Siam.

Practically nothing is recorded of its haunts and nothing about its nidification. Oates, Davison and others all say that it frequents ravines and nullahs in very dense forest, while Darling, who says that they were extremely common at Thoungyah, infers that they are great skulkers and very shy, retiring into dense cover whenever disturbed.

Harington, who took the nest of this Partridge, merely records (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 365, p. 1909) :—"Breeds at Taukchan in June."

In a letter to me he adds :—"I have at last got the eggs of *A. brunneopectus*; they were found by my man at Taukchan near Rangoon in open bamboo-jungle, and were laid on the ground in a hollow well filled in with bamboo-leaves and grass. I came out and took them myself, and shot a specimen of this Partridge close by, although not actually off the nest, and I have no doubt as to their authenticity."

They were taken on the 5th June and measure 37.6×28.5 , 36.6×28.4 , 37.4×28.5 and 37.5×28.4 mm.

Caloperdix oculea.**THE FERRUGINOUS WOOD-PARTRIDGE.**(1970) *Caloperdix oculea oculea* Temm.**THE FERRUGINOUS WOOD-PARTRIDGE.***Caloperdix oculea oculea*, Fauna B. I., Birds, 2nd ed. vol. v, p. 399.

To the North of Tenasserim Hopwood says this little Partridge is found as far as the Douna Range, which forms the watershed of the Tavoy, Ye and Thoungyin Rivers. It occurs South in South-West Siam and in the Malay Peninsula as far as Malacca.



NEST AND EGGS OF THE CHUKAR.
(Near Wular Lake, Kashmir, 1920.)

This is a bird of deep humid forests and practically nothing is known about it. As regards its nidification, Robinson wrote to me :—" I see you record its nidification as unknown in the ' Fauna.' I found a nest at the end of May, a matted pad of grass under the shelter of a scrubby hush. The single egg it contained was a glossy pure white."

***Alectoris græca* Meisner.**

THE CHUKAR.

(1972) *Alectoris græca chukar* (Gray).

THE INDIAN CHUKAR.

Alectoris græca chukar, Fauna B. I., Birds, 2nd ed. vol. v, p. 402.

Throughout the Himalayas as far East as Nepal this race is to be found, but not in Sind, Baluchistan, Northern Kashmir or Ladak. It also occurs in the hilly tracts of the Punjab.

It is found at all heights from the foot-hills up to 14,000 feet, mounting higher as the snows recede up to 16,000 feet, and breeding wherever found.

Great heat and intense cold seem to affect it in no way, but comparative dryness seems to be essential.

According to Hume, Wilson and others their favourite breeding grounds seem to be grassy hillsides, with or without a certain amount of cultivation and, indifferently, whether covered with a mere scanty growth of coarse grass or fairly well covered with bushes etc. in addition to the grass itself.

It is, however, found in almost any kind of country other than actual forest, but where there are grass uplands they are to be found in these also though they are surrounded by forests. Typically they are birds of the desert, rocky bare hills or the more moderately dry hills of the outer ranges of the Himalayas, which, though well-watered and wooded, have wide areas of grass-land and stretches of cultivation.

In the extreme North-West of its habitat it is often to be seen in the most barren and rocky of countries, great hillsides strewn with rocks and boulders, for the most part devoid of all vegetation beyond scattered tufts of withered grass, a few windbeaten and distorted bushes and, possibly, here and there in the hollows a wheat-field or some other attempt at cultivation.

The nest is, as a rule, merely a shallow saucer scratched in the ground and lined with a little grass or a few leaves; sometimes, however, it makes quite a good pad of grass, compacted with leaves and rubbish, in the middle of which it makes a depression for the eggs. Frequently the nest may be found in an open nullah or on a rocky hillside, merely protected from sun and rain by a rock or stone; more often a site is selected amid bushes, scrub,

willow-bushes or bracken, which give it some shade as well as screens it from the sight of enemies. It is never found in forest, but occasionally in long grass, especially if this is broken up by bare patches of rock and stones.

Whistler, in a letter to me, gives an interesting account of a curious site selected by a pair of these birds:—"Two nights ago, 11th June, I was going along the Hindustan-Tibet Road close to Gondla, 10,000 feet, in fact only some 200 yds. from the Rest-house at the entrance to the village, when my eye suddenly caught a Chukar sitting on the head of one of the pollard willows beside the road. Investigation showed that she was sitting on a well-made nest of leaves, which contained 12 eggs. These were rather stained, and there were a good many of the bird's own feathers in the nest, signs which are quoted locally as proof that the eggs are incubated. I accordingly took only two eggs in order to examine them. They proved, however, to be quite unincubated.

"The other nests I have seen were deep hollows in the ground well lined with bents etc. and all were well hidden by being placed either under a stone with herbage growing in front of it, or under a briar-bush or small green plant which is very common."

The breeding season extends from early April to June at the lower elevation, while even at Naini Tal Whymper took a clutch of six at 6,000 feet on the 10th of April. In the higher hills they do not breed until well into May, and eggs may be found up to the middle of July. In the Salt Range Theobald found it breeding in April and May.

The full clutch is anything from eight to twelve, but many birds lay more. Bates and Livesey found a nest near the Woolar Lake with twenty-two eggs, and Osmaston took one with twenty eggs near Srinagar and another with thirteen. Wilson also says they lay as many as fourteen, but Hume never found more than twelve.

In shape the eggs are rather long ovals, very much pointed at the smaller end. The texture is close and rather fine with the surface smooth and generally slightly glossy. In colour the ground ranges from very pale greyish or yellowish stone-colour to a pale creamy or buff, never bright or rich in tint. In nearly every case the whole surface is lightly freckled over with pale reddish-brown or pinkish-purple, a few eggs having, in addition, some larger freckles or small blotches of the same colour.

A curious clutch of six eggs taken by Whymper near Naini Tal has a creamy-buff ground blotched and smeared with brick-red-brown, in one egg the marking becoming clouds rather than smears.

Two hundred and fifty eggs average 43.0×31.4 mm.: maxima 48.2×32.1 and 46.1×33.1 mm.; minima 37.6×30.4 and 39.0×29.0 mm.

All birds of this genus are monogamous and in most cases the female alone incubates, but the male has been shot off the nest, so it is quite possible he sometimes shares regularly in this work.

In England the imported "Frenchman" (*Alectoris rufa*) is said often to have two clutches of eggs; the first is laid and then incubated by the cock, while the hen goes off and lays another clutch. Many keepers firmly believe this, and point to the fact that, though they never find bigger clutches than a dozen or so, they often find coveys of a great many more. On the other hand, the young in these coveys are all of the same age, whereas there would be ten to twenty days difference between the two broods if the idea was correct. I was told by a keeper in Norfolk that he had twice found the cock and hen thus sitting on two clutches, yet the young he supposed to have belonged to them must all have been hatched within forty-eight hours of one another.

(1973) *Alectoris græca koriakovi* Zarudny.

THE PERSIAN CHUKAR.

Alectoris græca koriakovi, Fauna B. I., Birds, 2nd ed. vol. v, p. 404.

This race of Chukar breeds in Baluchistan and in Sind in the Khirthar Range at 3,000 feet. Outside India it ranges to Eastern Persia.

It occurs in Sind and Baluchistan from about 2,000 feet upwards, but Betham found it breeding in Quetta above 5,000 feet.

The nesting habits are similar to those of the Chukar elsewhere, but it appears to keep more exclusively to barren wastes, rocky hills and stony nullahs. Its favourite resorts seem to be ravines with little or no vegetation except a few scraggy bushes or some half-burnt grass. Betham took eggs near Quetta in June, but Jones had eggs sent him by a friend from Pishin which were laid on the 9th April. In Persia Petherick tells me that these Partridges lay in May and June, making their nests most often in long grass on stony hillsides.

The eggs do not differ from those of the other races, but I have one clutch almost pure white in ground, while in another clutch the markings are absent in some eggs and scanty in the others.

Fifty eggs average 39.0×29.3 mm.: maxima 43.0×30.2 and 42.3×31.5 mm.; minima 35.2×28.2 and 38.0×26.4 mm.

(1974) *Alectoris græca pallescens* (Hume).

THE NORTHERN CHUKAR.

Alectoris græca pallescens, Fauna B. I., Birds, 2nd ed. vol. v, p. 404.

The Northern Chukar ranges from the Pamirs, Gilgit and the extreme North of Kashmir to Ladak, Eastern Turkestan and Yarkand.

The breeding habits of this race call for no special remark. Ward took several nests in Ladak and Northern Kashmir, and Osmaston

obtained one also, of which he writes (Journ. Bomb. Nat. Hist. Soc. vol. xxxii, p. 145, 1927):—"This Chukar takes the place of the common Chukar in the drier portions of Ladakh proper and is found from elevations of 9000' to 14,000', more especially in the neighbourhood of cultivation."

"A nest concealed at the base of a dwarf berberis-bush near Khardong Pass at 13,000' on the Shyok side of the Pass in Ladakh was discovered on July the 22nd. It contained 12 nearly fresh eggs indistinguishable from those of the common chukar."

The earliest eggs I have seen have been dated 3.5.05 (Ward) and the latest 22.7.25 (Osmaston).

The full clutch varies from eight to fourteen, and the eggs are, of course, indistinguishable from those of other Chukars.

Thirty-six eggs average 43.6×31.7 mm.: maxima 45.8×31.1 and 45.1×33.1 mm.; minima 41.2×31.2 and 43.5×30.1 mm.

Ammoperdix griseogularis.

THE SEESSEE PARTRIDGE.

(1975) *Ammoperdix griseogularis griseogularis* (Brandt).

THE SEESSEE PARTRIDGE.

Ammoperdix griseogularis griseogularis, Fauna B. I., Birds, 2nd ed. vol. v, p. 405.

This little Partridge extends from Persia, West to Berejik and Kamkale on the Euphrates; North to Transcaspia and Bokhara and South to Afghanistan, Baluchistan and Sind and East thence to the Khuriar Hills and the Salt Range in the Punjab.

The Seessee, even more than the Chukar, is a bird of barren stony wastes, rocky hillsides and stretches of boulders, stones and sun-baked earth. Even bush- and scrub-jungle they very seldom enter, but they will sometimes condescend to enter grass-land. Ravines in broken hilly country they especially affect, even though a few bushes and a little half-burnt grass may struggle for existence between the rocks and boulders.

It is in situations like these that the Seessee breeds at all elevations from the foot-hills up to some 6,000 or 7,000 feet. Whitehead found them breeding in the Kurram Valley, Chitral and Kohat etc. up to the latter height, and they have also been found in Afghanistan at this elevation, though they are more common below 6,000 feet.

The nest is merely a scratching in the ground, sometimes with a meagre lining of leaves and grass, rarely rather better filled with the same and with a few feathers of the bird. On the other hand, Whitehead found scrapes right out in the open with no pretence of a nest, the eggs being laid on the bare ground, under the shelter

of a boulder or one of the few tufts of withered grass which appear here and there on the sides of the hills. Occasionally in the ravines they are well sheltered under rocks and boulders but, even in these, they sometimes make their nesting-hollows unprotected, though convenient shelter is close at hand. The nest has been found on the cornice of a deserted building and once on the roof of a house temporarily unoccupied, the birds themselves often haunting buildings.

The breeding season is well defined, being from early April to the middle of June. In the Salt Range Theobald and others have found them breeding in these months and on the frontier Whitehead (Kohat and Kurram Valley) and Jones (Pishin) took eggs in April and May. A full clutch may be anything from four to fourteen but seven to nine are most often laid.

In shape the eggs are very pointed, rather broad ovals, the texture very hard, fine and close, having a decided surface-gloss. The colour varies from a creamy white or ivory-white to a pale buff and the eggs are invariably immaculate.

Seventy eggs average 34.8×25.5 mm. : maxima 38.7×26.8 and 37.3×28.8 mm. ; minima 32.0×24.6 and 32.4×23.1 mm.

The male has a curious little display when courting the female. After running round, bobbing and bowing, he stands quite upright on a stone or something else higher than his surroundings and puffs out the feathers of his breast and abdomen, the latter parting and showing up the strong markings on the flanks. I know of no other bird's display quite like this. The male is monogamous and helps to look after the chicks but takes no share in incubation.

Francolinus francolinus (Linn.).

THE BLACK PARTRIDGE.

(1976) *Francolinus francolinus asiæ* Bonap.

THE INDIAN BLACK PARTRIDGE.

Francolinus francolinus asiæ, Fauna B. I., Birds, 2nd ed. vol. v, p. 408.

Excluding Sind and the extreme North-West of India, this race of Black Partridge is found over the whole of Northern India as far East as Western Nepal and Bihar. South it extends to Deesa, Gwalia, Sambalpur and, in the Central Provinces, to Saran and Udaipur. Sparrow found it common around Trimulgherry in the Deccan; it occurs in Western Bengal now only as far as Chota Nagpur but, in 1883, there were a few birds still to be found as far East as the Santhal Parganas.

All the Black Partridges are birds which haunt grass-lands and scrub-jungle. It does not mind much what the grass-land is like; it may be thin and not more than two feet high or it may consist

of *ekra*, reeds and elephant-grass as much as 10 feet. Probably it prefers wide grass stretches in which the growth is about four feet in height and in which, occasionally, hushes appear here and there, showing their heads above the grass. If water is near by this is always an added attraction. I do not think they ever breed in evergreen or really thick deciduous forest but I have had records of them making their nests in *Sâl* forests where the trees are small and thinly grown and where there is a little grass or bush undergrowth.

They breed at considerable elevations. Dodsworth obtained nests near Simla at about 7,000 feet and Jones took several in the Keonthal State at about 6,000.

In some parts of the country where crops intervene between patches of scrub or between fields of grass, the birds frequent and breed in the standing crops, especially in those which attain a fair height during the breeding season, such as some of the millets. They have also been known to breed in sugar-cane fields, while in Bihar they formerly often nested in indigo fields.

The nest may be found in any one of the various types of country above referred to and, wherever it is placed, it is sure to be well concealed. It may vary much in size and quality, some nests being just a collection of a few leaves and bits of grass in a natural hollow, other nests good pads of grass in a scrape made by the birds, while a few are quite massive nests of accumulated leaves, grass-blades, sugar-cane leaves or other material. It is, of course, always on the ground and generally tucked away in among thick grass which completely hides it but, sometimes, it is hidden under a bush, among tamarisk or in a thick crop. The most exposed nests are those found in sugar-cane hut, even these, are placed where the canes are thickest or where some other growth helps to conceal them.

They breed in April, May and June, while a few birds may have two broods, as Cripps (in Faridpore), Hume, Hutton and others have taken eggs in July and August, while Whymper obtained a clutch of four hard-set eggs on the 21st October in Naini Tal (Journ. Bomh. Nat. Hist. Soc. vol. xvii, p. 232, 1906). In Bihar Inglis and Coltart both thought the bird bred twice in the year, for eggs are there commonly found in August and September as well as in "the early part of the year."

The number of eggs laid is generally six to nine but many writers say they lay much bigger clutches. Hutton, who describes the eggs as "dull greenish-white!", says they lay only six; Hume thinks six to ten; Jerdon says ten or twelve and sometimes fifteen "pale greenish" eggs, and I was told of a clutch of seventeen, perhaps the produce of two birds.

The eggs are very broad ovals but sometimes decidedly pointed at the smaller end. The texture is close, fine and hard, the shell thick in proportion to the size of the egg and the surface glossy.

In colour they vary from pale yellowish-stone, yellowish-olive or, more often, pale olive or olive-brown to a warm olive-brown or sienna-brown. I have also seen a clutch which was quite a deep olive chocolate-brown.

One hundred eggs average 37.8×31.3 mm. : maxima 42.0×33.1 and 40.0×34.0 mm. ; minima 32.8×30.4 and 36.0×29.2 mm.

The cock bird is monogamous and its breeding habits and post-breeding habits are those of the genus and are fully described under *F. f. melanonotus*, the Assam Black Partridge, which is the one I personally know best.

(1977) *Francolinus francolinus henrici** Bonap.

THE SIND BLACK PARTRIDGE.

Francolinus francolinus henrici, Fauna B. I., Birds, 2nd ed. vol. v, p. 410.

This pale race of Black Partridge extends from South Persia to Fao and Bagdad and to Baluchistan, Afghanistan and Sind.

Whitehead found a Black Partridge common in the Kohat and Kurram Valleys and a specimen from Chitral seems quite definitely referable to this race. Rattray also found it common on the North-West frontier, where Pitman took many nests and eggs. In Quetta again it is a common bird but does not seem to ascend the hills to any height. In Sind, the type-locality, Ticehurst thus sums up its status (Ibis, 1924, p. 511):—"This species is the Partridge of cultivation and thicker jungle bordering thereon, and especially of grass and tamarisk jungles. In Upper Sind it is, therefore, more abundant than in Lower, yet here also there are some good places."

"It breeds in March. Mr. Bell found two nests with hard-set eggs in each on 12 and 13 March, while Mr. Hotson tells me of a nest with young at Dada on 4 April; Le Messurier records half-grown young on 1 September, while Doig says it nests in April and September; Mr. Culbertson found nests of five and two eggs (fresh) on 16 September."

Pitman took a clutch of six fresh eggs in May and other eggs, one to three in a nest, in May and June, at Dehra Ismail Khan. Finally, Eates has taken eggs in Sind in April, May, September and October.

As regards the sites selected there is little to add to what has been written already about the other subspecies; grass and tamarisk seem to be the favourite cover but almost any form of scrub, reed or grass suffices. Judging from the above notes, the breeding season appears to be principally from the end of March to May, with a second burst of breeding in the end of August to October.

* I unite with this race *arabisticus* and *bogdanowi* and can see no point on which to separate them, but others accept all three (see Ticehurst, Ibis, 1924, p. 512).

So far as we know the clutches are always small. Four and five eggs have been frequently found hard-set while the largest clutch I have seen is seven.

In colour they are like those of other races of the species but, curious to say, at least 50 per cent. have little white flecks scattered about such as I have never seen in the eggs of the common Indian bird. An egg taken by Pitman is the usual pale blue of depigmented eggs of the common English Pheasant.

Thirty eggs average 39.0×31.7 mm. : maxima 42.2×31.2 and 40.1×33.4 mm. ; minima 31.4×29.7 mm.

Nothing is recorded of its habits differing from those of the Assam Black Partridge.

(1978) *Francolinus francolinus melanonotus* Hume.

THE ASSAM BLACK PARTRIDGE.

Francolinus francolinus melanonotus, Fauna B. I., Birds, 2nd ed. vol. v, p. 411.

This fine Black Partridge extends from Sikkim to the whole of Assam, Eastern Bengal, Manipur, Lushai and Chittagong Hill Tracts. Birds from Nepal, though somewhat intermediate between *asiz* and this race, are nearest to the latter, while the same may be said of those from Central Bengal and Orissa.

They breed from the plains up to 6,000 feet, though seldom over 4,000, while their favourite elevation is between 2,000 and 3,000 feet.

Their habitat *par excellence* is in the immense stretches of sun-grass land which are found in Assam, the Duars, the alluvial banks of the great rivers and in the lower hills of the outer Himalayas and hills of the Surma Valley. They do not mind much what height the grass is, though they prefer such as is between 2 and 4 feet high. I have found them in the buffalo haunts of the Brahmapootra Valley where the great ekra-stems meet over your elephants' heads when out shooting. Again I have seen them in numbers in the half-eaten, much-trodden-down grass on the outskirts of isolated villages where the whole stretch is cut up with cattle-tracks and with patches from which the grass has been cut for thatch.

Unlike the other races, these birds are very seldom found in scrub and hush-jungle and never in real forest. In the North Cachar Hills the Black Partridge was comparatively common in the vast rolling downs at about 1,500-2,500 feet. All this area was covered with sun-grass which was burnt off every year by the hill-tribes in February and March and immediately the young grass shot up, so that by April and May it was about 18 inches to 2 feet high in the upper parts of the hills and still longer on the sides. In the wet pockets and hollows between the hills much of the reeds and ekra growth was never quite burnt out, leaving a tall tangle of growth,

sometimes as much as 8 or 10 feet high, beloved by buffalo, who there found wallows and cool cover in the middle of the day. The Partridge generally bred in the shorter grass but I have also found nests in the long stuff and once stalked and killed a fine bull buffalo with a shot which disturbed a Partridge off her nest almost at my feet.

The nest varies considerably. As a rule it is a slight, ill-formed pad of grass and dead leaves, collected in some small hollow, natural or otherwise, scraped in the ground but, now and then, one finds quite a well-made nest. One such I came across near Shillong placed between grass-roots on the side of a grass-covered hill close to the station. Cattle had been feeding in this grass, making deep little tracks among the roots, the nest being wedged into one of these paths. The base was a compact mass of dead leaves, grass and bracken-fronds, over which was laid a thick lining of grass worked up on either side, so that the nest was almost semi-doined. The nearest bracken grew at least 100 yards from the nest, so that in this instance the birds must have taken much time and trouble to make it so comfortable.

The nest is easy to find, for the cock calls his cheery challenge, morning and evening, near the nest and a search round where he calls will soon reveal the female on it. Often, also, the nest is built close to some land-mark such as an ant-hill or a high bush, around which one should hunt first before looking further afield.

The breeding season varies locally and according to the break of the rains or the firing of the grass. Thus in North Cachar practically every hen laid in April immediately after the first light rains had brought on the grass; in the plains of Assam many birds laid in March but others continued to lay until June, though in lessening numbers, but in July and August there is a fresh rush of eggs, when the earliest birds have their second broods.

The clutches are not big, four to six being the normal complement. I have once seen eight, a few times seven and I have also seen three eggs incubated.

In colour the eggs are quite normal. A certain number have the curious little white flecks referred to under *henrici* but these are neither so large nor so numerous.

One hundred and fifty eggs average 37.0×31.5 mm.: maxima 40.3×32.3 and 37.6×33.3 mm.; minima 34.0×28.3 and 34.3×27.7 mm.

The cock bird is monogamous and not pugnacious.

In North Cachar I could often watch the birds afar off from the crest of a hill and listen to their ringing challenges in every direction. Often I have seen a bird mount some termite hill or fallen stump, flutter his wings and utter the "che-cherree, chick-cherree" challenge time after time, yet never have I known anything beyond a vocal reply to it.

The hen does all the work of incubation and probably all the work—such as it is—of preparing the nest but I have seen a cock bird running about with a piece of grass in his bill, probably only as an encouragement to the hen to get to work. Incubation takes about sixteen days, certainly not less and possibly a day or two more.

Francolinus pictus.

THE PAINTED PARTRIDGE.

(1979) *Francolinus pictus pictus* (Jard. & Selby).

THE SOUTHERN PAINTED PARTRIDGE.

Francolinus pictus pictus, Fauna B. I., Birds, 2nd ed. vol. v, p. 412.

The Southern Painted Partridge is found in Ceylon and Southern India. On the West it occurs as far North as Khandesh and thence South of a line drawn to Raipur, from which again it extends to Chandra and into Bihar. In Ceylon Wait says that it is confined to the Uva Basin and to the Eastern and South-Eastern slopes of the hills.

The haunts of the Painted Partridge are not unlike those of the Black Partridge but, whereas the latter likes thick cover, damp if possible, the former likes very dry jungle and does not mind it being thin and scanty. It never enters the dense forest on the Western coast but, wherever cultivation has taken the place of forest and grass has later grown up over the abandoned areas, there, almost to a certainty, the Painted Partridge will sooner or later put in an appearance. Its favourite haunts are patches of short grass or thin scrub in broken stony plateaux and plains, with scattered trees here and there on which they can perch. For breeding purposes they also often select patches or strips of grass and scrub in between cultivated fields while, occasionally, the nests have been seen in crops of grain.

The nests themselves are the primitive affairs of the genus but are often placed under the protection of a bush and fairly well hidden. As a rule there is a hollow of some kind but often the eggs are laid on the bare ground, the fallen débris alone saving them from rolling about.

Throughout its habitat this Partridge appears to breed only after the break of the monsoon, *i. e.*, the end of June, and thence onwards to the end of September. In and around Trimulgherry Sparrow found a number of nests in July and August, and Vidal obtained others near Sholapur in September. In Ceylon, according to Wait, "it breeds apparently about Xmas, making a grass nest in a hollow under a bush or tuft of grass."

The number of eggs laid in a clutch is three to six and even six seems unusual, though collectors talk about seven and eight.

Personally I have never *seen* more than six, though the larger numbers may occasionally be laid.

The eggs are of the same type as those of the Black Partridges, broad, often pointed ovals, of hard texture with fine glossy surfaces. They are much paler, however, and are generally a very pale olive-grey or olive-drab with a decided yellowish tinge in many cases.

All the eggs in Hume's series are those of the Northern race, *pallidus*, and I have only obtained the measurements of fifteen eggs of the Southern race, which average 35.9×30.9 mm. : maxima 37.8×31.9 and 36.5×32.0 mm. ; minima 33.6×28.4 mm.

(1980) *Francolinus pictus pallidus* Gray

THE NORTHERN PAINTED PARTRIDGE.

Francolinus pictus pallidus, Fauna B. I., Birds, 2nd ed. vol. v, p. 414.

Roughly speaking the range of this Partridge is North of that of the preceding bird and South of that of the Black Partridge. The Southern line may be said to run from Khandesh on the West to Raipur and Chanda but not Bihar. North, the line may be taken from Deesa to Udaipur. In many places the two species overlap and breed in the area normally occupied by the other.

There is little one can add concerning the breeding of this race ; they nest in exactly the same kind of cover as a rule but, where there is much sugar-cane, the birds will sometimes nest in this as in other cultivation. The time of breeding is also the same but Whithead (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 168, 1911) found them laying in April, May and June and it may be that the Painted Partridges, like the Black, may have a double season and two broods in certain localities.

As usual many writers give this bird the credit of laying large clutches of eggs. J. Aitken says " five to eight eggs may be found in a nest " (Berar) ; Blewitt says " the number of eggs is about 7 or 8 " (Jhansi) ; Jerdon notes the same. Butler, writing of Aboo, does not give the number. I have eggs from the Vidal collection but there are only four or five eggs in each clutch and Betham only found four laid in those he examined in Baroda.

The eggs are just like those of the previous race and the measurements of twenty-nine eggs are :—Average 35.7×29.5 mm. : maxima 38.8×30.1 and 36.4×31.7 mm. ; minima 33.0×29.1 and 35.0×27.9 mm.

There is nothing special to note about their habits etc., which are all very like those of the Black Partridges. They are monogamous, very noisy, cheery birds in the breeding season but are not pugnacious.

Francolinus pintadeanus Scop.**THE CHINESE FRANCOLIN.****(1981) Francolinus pintadeanus phayrei (Blyth).****THE BURMESE FRANCOLIN.***Francolinus pintadeanus phayrei*, Fauna B. I., Birds, 2nd ed. vol. v, p. 415.

This Francolin ranges from Manipur on the West over practically the whole of Burma to the Shan States and Yunnan, whence it extends through the Indo-Chinese countries to Formosa. In Burma its Southern limits appear to be in the neighbourhood of Prome, while West of the Irrawaddy it is less common than to the East. At the same time Higgins (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 368, 1914) says that this Francolin is very common in the extreme South-East of Manipur and that he heard the cocks "calling all over the place," and remarks: "I shot one for purposes of identification. The common Francolin of Manipur elsewhere is of course the Black Partridge."

Oates gives a capital summary of its haunts ('Handbook Game-Birds,' vol. i, p. 164, 1893):—"The Chinese Francolin is found in dry open forest and scrub-jungle, and it generally keeps to hilly undulating country in preference to the low flat plains. It is found in nearly every part where the rainfall is moderate, and it avoids thick humid forests. It frequents the smaller tracts of cultivation when these are surrounded by high grass and brushwood intermingled with low trees."

To this must be added that it is common in many parts of the great grass plains, whether these are of short sun-grass or of very long and strong elephant-grass and reeds. Elsewhere Oates refers to the bird frequenting bamboo-jungle and says: "Almost every bamboo-clad hillside will yield 5 or 6 birds."

The nest is the usual Francolin's nest and needs no further description beyond stating that it appears to be generally placed at the foot of a thick bush and is, perhaps, more often made in scrub- and bush-jungle and less often in open grass-land than are those of the Black Partridges.

The breeding season covers a long period. Oates writes (*op. cit.*):—"This Francolin breeds in May or June but Mr. D. D. Macdonald took a large number of eggs for me at Meiktilla in September. It probably breeds in many months of the year according to locality."

Harington obtained eggs near Mounyai in March; Hopwood and Mackenzie in Lower Burma in March and April; Hopwood at Posa in May; Cook found eggs in the Kachin Hills in June. Mackenzie at Pakkoku from July to September, while both Harington and Macdonald took eggs as late as October in the Kachin Hills and Shan States.

It is practically certain that many, if not most, birds have two breeding seasons and two broods, one between March and June and the second between July and September. In China Kershaw says of the typical form (Ibis, 1904, p. 244) that it certainly has two broods in the year. The number of eggs laid is three to seven, generally four or five, and I have no records of bigger clutches of eggs of this species.

In appearance, shape and colour they are quite typical but the texture is not so close and hard as in the eggs of other Francolins, and the shell is much thinner and more brittle.

The great majority of eggs are of a warm creamy buff tint, occasionally faintly olive, but I have one clutch taken by T. R. Livesey in the Shan States which is olive-green, with the green very pronounced.

Eighty-four eggs average 35.3×23.7 mm. : maxima 40.6×28.3 and 38.2×30.5 mm. ; minima 31.8×27.6 and 38.1×26.7 mm.

Like the rest of the genus, this Partridge is monogamous. There seems to be no special characteristic of this bird when breeding other than those common to them all.

(1982) *Francolinus gularis* (Temm.).

THE KYAH OR SWAMP PARTRIDGE.

Francolinus gularis, Fauna B. I., Birds, 2nd ed. vol. v, p. 417.

The range of this Partridge extends from the sub-Himalayan Terai in the North-West, Punjab and United Provinces to Eastern Assam. In fact it is found over the whole of the alluvial country watered by the Ganges, Brahmapootra and Megna Rivers, together with their great and small tributaries. It is rare in Chittagong and does not extend to Arakan but is very common in the Sunderbands and in Cachar, Sylhet, Tippera and Noakhali. It does not normally ascend the hills above the regions of swamps but Godwin-Austen obtained it in the Khasia Hills plateau land over 5,000 feet, where there is some rice cultivation and some swamps formed by irrigation and damming.

These Partridges keep entirely to the huge shallow swamps surrounded by a great extent of ekra- and reed-beds standing in mud or in actual water and they are never found outside these except when feeding or forced out by abnormal floods. Then they take to the long grass which, more often than not, adjoins the reed-bed. In Bihar it is said to breed occasionally in long thatching grass on the banks of rivers and nullahs. Rainey also took a nest with five eggs, obviously correctly identified, in Jessore which was placed in thatching grass "close to the margin of a dry tank covered with dense jungle."

Hole, Primrose, Inglis and I took many nests in Cachar and Sylhet while Coltart and I took others in Lakhimpur but all these were placed in the long reeds and ekra in swamps or at their edges, or in among the dense tangle of mixed reed and scrub growing on small muddy or half-submerged islands in their midst.

Generally the nest is built in among the growing and broken-down reeds etc. actually in the water, sometimes just mud and water a few inches deep but, sometimes, in water 18 inches or more in depth. The nest itself is a well-made thick pad of rushes, weeds and leaves of "nal," anything from 8 to 12 inches across, while the actual pad is 2 to 4 inches thick, the sides being raised another 2 to 4 inches to form a cup to receive the eggs. The base of the nest is sometimes wet, but inside it always seems to be dry and warm. When built on dry ground in among the reeds the nest is neither so deep nor so well built as when it rests directly on the ground but, when resting on a tangle of broken-down reeds etc., it is so well put together that one can sometimes carry it away as a whole without it coming to pieces.

The nests are very difficult to locate, even after the male has been heard calling, as they are invariably built in the densest parts of the cover, whatever that may be, selected to breed in. Fortunately the hens are very close sitters and, with a line of beaters, it is generally possible to get within a few feet of the bird before she flounders off her nest in a great flurry and with many loud protests.

They are early breeders, most eggs being laid in March and April, but Hole obtained eggs in Sylhet in February. Occasionally they lay in May, in which month Inglis in Cachar, Coltart in Bihar and Primrose in Goalpara all obtained fresh eggs. In the United Provinces Whympers found nests and eggs in early April.

The normal clutch is four or five eggs, but sometimes six are laid and sometimes only three.

The eggs bear a close resemblance to those of the other Francolins but a few look as if they could not belong to any bird of the genus *Francolinus*. These latter vary from almost white to a warm buff and are blotched or mottled with pale dirty brown or reddish-brown, sometimes quite heavily, generally rather sparsely. I have taken this type of egg myself, shooting the female off the nest, and some captive birds in Inglis's aviaries also laid these spotted eggs.

Other eggs are just like those of most Francolins but, as a series, are a rather *bright* pale buff. I have seen no olive eggs of this species.

Forty-eight eggs average 39.4×30.0 mm. : maxima 42.0×29.9 and 36.6×31.3 mm. ; minima 36.1×29.3 and 38.2×29.0 mm.

The Kyah is monogamous and is just as good a father to the chicks when once they are hatched but, unlike most Francolins, who bluster and do little more, he is very pugnacious and constant fights take place between the males, not for the possession of the females so

much as by way of recreation when the females are sitting. Of course young unmated males may sometimes arouse a husband's jealous fury but, once mated, they are settled for good and all, and domestic troubles are not common.

Francolinus pondicerianus.

THE GREY PARTRIDGE.

(1983) **Francolinus pondicerianus pondicerianus** (Gmelin).

THE SOUTHERN GREY PARTRIDGE.

Francolinus pondicerianus pondicerianus, Fauna B. I., Birds, 2nd ed. vol. v, p. 419.

This Grey Partridge is found in India roughly South of a line running from about the latitude of Poona on the West, through the centre and North-East of the Deccan, to about the latitude of the mouths of the Godavery on the East. It also occurs in Ceylon but is "restricted to the dry zone of the North-West coast from the Jaffna Peninsula to Puttalam" (Wait).

It was imported into the Andamans by Brooks and Osmaston found it breeding freely there in 1907.

The Grey Partridge, whichever the race, is a bird neither of the wettest parts nor of the driest areas except when the latter are immediately surrounding lakes or swamps or bordering large rivers. It prefers patches of grass, thin scrub- or bush-jungle in between cultivated areas and is quite common in mixed waste and crop-lands in the vicinity of villages. In the huge extents of grass-lands beloved by the Black Partridges they will seldom be found and then only on the outskirts near civilization. Standing crops they constantly enter and often breed in, but they have also been known to make their nests in ploughed fields and fallow-land. Another favourite site, according to Aitken, is "babool jungle growing by the side of a stream."

The nest is quite typical of the genus and all the various races make the same kind in similar positions and varying to the same extent.

As a rule a scrape in the ground lined with a little grass or a few leaves is all one finds, while often the eggs are laid on the bare ground with no attempt at a nest of any kind. On the other hand there is sometimes what Hume terms "a tolerably substantial pad-nest of grass and leaves."

Exceptionally these Partridges place their nests in raised positions. Hume says "it is usually placed on the ground, under some large clod in a ploughed field, under a bush, or a tuft of grass,

but is sometimes fixed in the lower branches of some dense thorny shrub as much as three feet from the ground" (the italics are mine). Marshall (G. F. L.) also found a nest in the Saharunpore district "laid on a rough platform of grass and leaves in the middle of a tuft of sakery grass about 18 inches from the ground." He also describes an even more unusual nest as "lined very neatly with feathers and soft leaves.

Yet again a nest described by A. Anderson must be referred to as out of the common. Writing of a search for a nest in a hedge of Sarpat grass he remarks: "Looking down into the centre of each clump soon discovered what proved to be hen partridge. She absolutely refused to move so I decided on capturing her on her nest which was effected. The nest was carefully fenced in with grass-stalks, of the thickness of an ordinary cane, so that ingress and egress for so big a bird must have been a matter of no little difficulty."

The breeding season is an early one; Hume, speaking of all the races, says "they breed from February to June and again from September to November," but his words apply equally well to this.

I have records of eggs taken in February in Sattara (Vidal), Kanara (Davidson); during March, April and May in many places (Hume, Vidal, Davidson, Barnes, Bourdillon, Theobald, Marshall etc.); in June (Jerdon and Barnes); in July (Osmaston); in August, September and October (Col. Butler, Theobald, Hume); and finally in November (Hume). That is to say, every month in the year except December and January.

At the same time there are two distinct rush periods, the first in April and early May, the other in August and September, and it seems certain that many birds have two broods.

The number of eggs in a clutch varies from four to eight, occasionally nine; six or seven being the usual number.

In shape they are broad ovals, sometimes rather pointed, while exceptional clutches are very long ovals, slightly or greatly pointed.

In colour they are a pale buff varying very little in depth or in tint.

One hundred eggs average 34.5×26.1 mm. : maxima 37.3×23.2 and 35.2×27.8 mm. ; minima 31.6×24.0 and 32.6×22.8 mm.

The male is monogamous, probably pairing for life; he is also a good husband and father but does not help in incubation, which lasts about twenty days.

The female is a very close sitter, sometimes refusing to move until caught, as in Anderson's instance, and often lying close until almost trodden on.

The cocks are great fighters not only in the breeding season but at all times, fighting for the love of the game and not only for their wives and families.

(1984) *Francolinus pondicerianus interpositus* Hartert.

THE NORTHERN GREY PARTRIDGE.

Francolinus pondicerianus interpositus, Fauna B. I., Birds, 2nd ed. vol. v, p. 421.

The range of this race of Grey Partridge is North of that of the preceding bird, i. e., North of a line from Poona to the Godavery, from the South of Sind East to Bihar and Western Bengal throughout the drier districts of Chota Nagpore to Rajmahal.

Birds from the South of Sind are somewhat intermediate but are nearer *interpositus* than to *mecranensis*. In the Punjab the Indus may be taken as the dividing line between *mecranensis* on the West and *interpositus* on the East. In Guzerat the birds approach nearer to true *pondicerianus*.

Having given the habitat of the subspecies, there is little to add to what has already been written as to the nidification and breeding habits of the preceding species.

The Northern bird seems rather fond of placing its nest at the bottom of cactus hedges but, for the rest, makes its nest and selects sites just as the Southern bird does.

Like that bird also it breeds over the greater part of the year, with two definite seasons, March to May and August to September, during which most eggs are laid.

The eggs may vary a little more than those of the other races in a large series and I have all degrees of shade, from a pale creamy buff to a deep warm buff.

Ninety eggs average 32.4×25.6 mm.; maxima 35.8×26.2 and 35.6×27.4 mm.; minima 30.2×24.8 and 30.4×23.0 mm.

(1985) *Francolinus pondicerianus mecranensis* Zarud. & Harm.

THE MECRAN GREY PARTRIDGE.

Francolinus pondicerianus mecranensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 422.

This race was described from the Mekran coast, whence it is found in Sind, the hills of the North-West Frontier, Baluchistan and Afghanistan to South Persia.

Ticahurst considers that no Sind specimens can definitely be placed under *mecranensis*, though many specimens are intermediate. I consider, judging from the breeding specimens that I have seen from Sukkur, Baluchistan, that, although not quite typical, they are too pale to be placed with either of the two other Indian races.

Except that it inhabits drier, more desert areas than the other races, there is nothing to note in particular about this race. Even so, it does not haunt the actual deserts but selects tracts in which there is some cultivation or which is not too dry to support a growth of grass or some other vegetation.

As regards the eggs, an examination of a series shows strikingly that they average much paler and agree with those I have received from South Persia. The darkest about equal the average colour of the eggs of the other races while the palest are almost white.

Eighty-one eggs average 34.0×26.0 mm.; maxima 37.3×25.6 and 35.0×27.6 mm.; minima 31.0×24.4 mm.

Perdix hodgsoniæ.

THE TIBETAN PARTRIDGE.

(1986) *Perdix hodgsoniæ hodgsoniæ* Hodgs.

THE TIBETAN PARTRIDGE.

Perdix hodgsoniæ hodgsoniæ, Fauna B. I., Birds, 2nd ed. vol. v, p. 423.

The typical form of Tibetan Partridge ranges from Western Tibet to the Abor and Mishmi Hills and is not rare in the highest plateaux of Nepal and Sikkim.

Ludlow (Ibis, 1925, p. 217) thus sums up his experience of these Partridges:—"This is a common bird in suitable localities from Gyantse to Phari. It may occasionally be seen near Dota in the Chumbi Valley but not below. A few are to be found on the actual plain of Gyantse, but they generally keep to the side nullahs which open in to it, especially if these nullahs are cultivated and there is cover in the shape of buckthorn and Tibetan furze. The birds keep in coveys right through the winter and do not pair off until the end of March. Eggs are laid in June. The nest is generally a mere depression in the ground, lined with dry grass and placed under shelter of a small bush. Nests may be found on low banks between the barley fields, or high up on the mountain slopes."

It breeds from 11,000 feet upwards but how high is not recorded. Mr. D. Macdonald told me they bred certainly up to 15,000 feet, and he believes up to 17,000, but Captain Barnes found a nest with ten eggs at an elevation of 16,430 feet on the Pass leading from the Pangong Valley to the Indus Valley in Tibet.

Hume found them in far bleaker areas than either Bailey or Ludlow describe as normal. He writes:—"The entire aspect of the hill where these birds were found was dreary and desolate to a degree—no grass, no bushes, only here and there, fed by the melting snow above, little patches and streaks of mossy herbage, on which I suppose the birds were feeding."

Bailey, however, notes (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 179, 1911):—"Found in the crops in the Trangpo Valley from Pea npwards." In conversation also he told me that the birds do not by preference inhabit the more rugged and bare portions of the Gyantse plateau but are found in places where there are crops,

grass or good cover in the way of bushes. Steen also, in a letter to me, said that he nearly always found the birds and their nests close to crops.

Macdonald, Steen, Kennedy and others have sent me many clutches of this bird's eggs and the former says of the first four sent to me :—"The above four clutches were all collected near Gyantse. The eggs were laid in scratchings or in natural hollows in the soil, in some of which wind-blown leaves and rubbish formed a bed for the eggs, but there was no distinct lining or nest made by the birds. Some nests were placed under the shelter of boulders or bushes and others among the short prickly little bushes which cover so much of the Tibetan plateau. Wherever placed they were always on the leeward side of the hill. A few nests were found in quite open stony bare ground and a few others in standing crops or thick grass." Of another nest he writes : "It was placed in a hollow scratched out by the birds on the leeward side of, and practically under, a large boulder. A few leaves and a little grass were in the nest but how they got there I do not know."

The first few eggs are laid in May but nearly all the eggs sent to me have been taken in June and a few in July. The birds are probably not double-brooded.

The full clutch is large, eight to ten are usual and eleven and twelve by no means rare. The eggs are fine and close in texture but the surface of the shell is dull and glossless.

In shape they are long ovals, often slightly pointed, much longer in proportion than the eggs of any of the Francolins.

In colour the eggs are a dark brown-buff, darker than any but the darkest of the Francolin eggs, while a certain number are quite definitely tinged with olive.

One hundred and fifty eggs average 37.6×27.2 mm. : maxima 43.0×26.3 and 39.2×28.4 mm. ; minima 34.5×27.1 and 38.9×24.1 mm.

Tetraogallus himalayensis.

THE SNOW-CKOCK.

(1989) *Tetraogallus himalayensis himalayensis* Gray.

THE HIMALAYAN SNOW-CKOCK.

Tetraogallus himalayensis himalayensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 426.

This grand bird is found in the Himalayas from Tianschan, the Pamirs and Eastern Afghanistan to Kashmir, Ladak and Garhwal, where it is a resident breeding bird between 12,000 and 15,000 feet, ascending casually in Summer and possibly nesting some 2,000 or even 3,000 feet higher. A. E. Osmaston records its occurrence

as low as 8,000 feet, while in Kohat Whitehead (*Ibis*, 1909, p. 270) says it is found in Winter down to 6,000 feet and breeds in the Safed Koh from 9,000 feet upwards.

The fullest account of its breeding habits that I can find is that of A. E. Osmaston (*Journ. Bomb. Nat. Hist. Soc.* vol. xxviii, p. 159, 1921), who writes that in Garhwal "in Summer this bird not uncommonly descends to 8,000' elevation, but never to my knowledge enters forest of any description. It is never found away from those spurs which diverge directly from the main Himalayan range, though a few birds annually frequent the bare slopes above Kheta in the Pindar Valley during the winter months. I have never seen it in any numbers except in the tract lying north of Malari and Niti, where it is fairly common. The breeding call is a prolonged whistle uttered with great persistence. The male when courting pursues the female in a crouching position with the tail held vertically up in the air. After a few minutes of this courtship they probably both take to their wings, making a loud whistling cackle as long as the flight continues."

In Ladak, B. B. Osmaston says (*Ibis*, 1925, p. 711), "this fine bird is common on the higher ranges from about 13,000 feet up to the snow line. They frequent bare rocky hills."

In Kashmir and Ladak Ward obtained numerous nests from 12,000 feet upwards, and he too stresses the point that the birds inhabit and breed in the barest stony hill-sides and never seem to seek cover of any sort other than boulder and rocks or, occasionally, a withered tuft of coarse grass.

Apparently the Snow-Cock never makes any nest beyond scratching out a hollow which may be placed among stones and boulders quite in the open, or may be under a ledge of rock, as found by Whymper in Garhwal, or a tuft of long grass as found by Ward on the Kashmir-Ladak boundary. No lining is ever, so far as I can trace, placed in the hollow by the birds themselves, though oddments may be blown into it, but Ward tells me that the nests are nearly always on the hill-side which is best protected from the prevailing wind. "Mountaineer" (F. Wilson) records the same (Hume's 'Nests and Eggs,' vol. iii, p. 427) :—"The nest is a hole scratched in the ground under shelter of a stone or rock, a tuft of grass or a juniper or other hush of the high regions where it breeds. They exercise considerable ingenuity in picking out places for their nests, for they will almost always be found well sheltered from the rain. None make a nest, they bring nothing as material to it, but nests where grass and leaves are thick are well lined with these and feathers."

The breeding season is early for such high elevations. Many birds lay in April and I have records from Ladak between 18th April and 27th June. Scully obtained a full clutch in Gilgit on the 28th April and Biddulph found young ones, about three days old, on the 28th May.

The normal complete clutch is probably five or six but Whistler, Osmaston and others have taken as many as seven, while the natives assured "Mountaineer" that they laid as many as nine or even twelve, though he personally never found more than five, while Ward obtained a clutch of three well incubated and four only are often laid.

In shape the eggs are broad to long ovals, often decidedly pointed at the smaller end. For so large an egg the texture is fine and close, while the surface often has a high gloss. It is not, however, smooth; many eggs have tiny pores like a Peafowl's egg, while others have tiny pimples and corrugations which can be felt by the finger-tips more easily than seen.

In colour the eggs vary from a pale yellowish stone-colour to a rather rich reddish-buff. In a few eggs there is a faint tinge of olive-green or grey but these are exceptions. Hume calls the eggs olive-brown, probably by a slip, as I have seen none which could be so called. The markings consist of rather scanty small blotches and specks of reddish-brown, scattered over the whole surface but nearly always more numerous at the smaller end, a character of this egg to which Hume also draws attention.

Sixty-eight eggs average 65.4×45.4 mm. : maxima 72.8×47.0 and 68.0×48.2 mm. ; minima 62.0×43.1 mm.

Snow-Cocks are monogamous and are excellent fathers and husbands but take no part in incubation, which is said to last thirty-one days.

The courtship display of the male is rather like that of Grouse. The male crouches down on the ground with feathers ruffled and the wings slightly spread and tail depressed; rising from this attitude, he runs backwards and forwards in front of the hen or right round her, the wings still slightly spread and the tail held vertically, the female usually continuing to feed all the time and then suddenly squatting to receive his attentions.

Tetraogallus tibetanus.

THE TIBET SNOW-COCK.

(1990) *Tetraogallus tibetanus tibetanus* Gould.

THE WESTERN TIBET SNOW-COCK.

Tetraogallus tibetanus tibetanus, Fauna B. I., Birds, 2nd ed. vol. v, p. 429.

This smaller species of Snow-Cock occurs at much the same elevations as the preceding bird in the Himalayas from the Pamirs to Yarkand, Ladak and North-West Tibet.

The breeding haunts and nidification of this Snow-Cock are very similar to that of the Himalayan species. They breed in the most bare and desolate areas between 13,000 and 17,000 feet and,

it is said, is found and may breed up to 19,000 feet. There is nothing that can be noted as to its breeding that does not apply equally well to the next and better known bird.

The breeding season is principally in June and July but B. B. Osmaaston took a clutch of seven eggs near Leh on the 27th May, while in August Przewalsky found young no bigger than Quails, which would infer eggs in late July, so the season must be a fairly long one.

The normal number of eggs in a clutch is probably four to seven but Przewalsky says that "the number of young belonging to a nest varies from five to ten," so possibly the clutches are sometimes as large as the latter figure unless two broods of young had joined forces, as those of the Himalayan birds often do.

The eggs are just like those of the Himalayan Snow-Cock, but all those I have seen have been marked equally over the whole surface or slightly more heavily at the larger end than elsewhere.

The only sixteen eggs I have been able to measure average 63.8×44.1 mm. : maxima 68.6×44.0 and 66.4×46.9 mm. ; minima 58.4×42.4 and 60.5×41.1 mm.

(1991) *Tetraogallus tibetanus centralis* Sushkin.

THE CENTRAL TIBETAN SNOW-CKOCK.

Tetraogallus tibetanus centralis, Fauna B. I., Birds, 2nd ed. vol. v, p. 430.

The additional races of Snow-Cock created by Sushkin greatly restricts the range of this subspecies, formerly included in the more Eastern race, *przewalskii*. It was named from specimens from the Tangla Mountains and Sushkin defines its limits as follows :— "Humboldt Range ; Tang-la ; northern slope of Burkhan-budda ; Southern Kuku-nor Range nearly as far East as Dangerling or Jenkar." This includes Southern Tibet with all the Gyantse plateau and farther West, whence we have more information about the bird than anywhere else.

It is an extraordinarily common bird on the plateau surrounding Gyantse, where Steen, Kennedy, McGregor and many others have found very numerous nests of this bird, and Ludlow, one of the last to write about it, says (*Ibis*, 1928, p. 218) :—"This bird is met with at all elevations between Phari and Gyantse. Three miles or so below the Tse-chen monastery, on the Gyantse-Sbigatse road, I have on more than one occasion shot these birds in winter in barley-fields 30 yards or more from any hill slope."

Summarizing the numerous notes I have had sent me from many correspondents when forwarding eggs, the habits and nidification of these Snow-Cocks may be described as follows :—They breed at all heights from 12,000 feet, which is exceptional, up to 15,000 and, more rarely, up to 17,000 feet, keeping almost entirely to stony hill-sides, rocky gorges and barren plateaux on the tops of the ranges. Here, over much of the country, there is practically no vegetation

Occasionally in the pockets there is a certain amount of grass, while tufts of the same are scattered along the crests and sides of the hills where sheltered from the wind. Sometimes little thickets of thorn and scrubby bushes may also be found but on most hill-sides these only appear singly and seldom. On the Gyantse plain, where there is cultivation or, in many places, quite a thick growth of grass or trees and bush-jungle, these birds are never found in Summer and certainly never breed. I have had many eggs sent me "from Gyantse," but all these have been taken from the hills surrounding the plateau itself.

The nest is much the same as that of the Himalayan Snow-Cock but the scrape is more often made under the shelter of a bush, thorny or otherwise, or among and under some of the tufts of half burnt, more than half withered clumps of grass on the hill-side. Often, however, they are placed among stones and boulders, either under the shelter of a rock larger than those around or without any shelter at all. This Snow-Cock makes a lining to its nest in most cases, collecting dead leaves and grass to place in the hollow made or selected for the eggs. The nest, in whatever position it may be, is invariably placed on the leeward side of a hill and, from what I have been told, often within a few yards of the crest of the hill.

Four out of five clutches of eggs are laid in May and June but I have seen eggs taken from the 15th April to the 25th August, though it does not seem that they ever breed twice unless an early clutch is destroyed or stolen.

The number of eggs in a clutch is usually four to six, though seven have been found and three also hard-set. Possibly eight are met with occasionally.

The eggs are just like those of the Himalayan Snow-Cock but, curiously enough, a very large proportion are spotted more heavily at the smaller than at the larger end. A few eggs are, perhaps, more boldly and freely marked than any of those I have seen of the larger bird, but this is probably merely because I have seen twenty of this species to every one I have seen of the Himalayan.

One hundred and forty eggs average 62.6×43.2 mm. : maxima 68.0×44.9 and 66.1×45.0 mm. ; minima 57.7×40.6 and 60.0×40.3 mm.

The cock is monogamous and is a very good husband, helping his wife to look after the chicks and, when she is sitting, generally staying within a short distance of the nest, keeping a bright look-out and warning her by a loud whistle when danger is near. The hen sits very close and, if the cock is away feeding, can be approached very near before she runs off the nest.

When the chicks are hatched two or three hens often join together and the number of chicks thus seen in one party may have given rise to the idea that the clutches of eggs laid are so much bigger than is really the case.

(1993) *Lerwa lerwa* (Hodgs.).

THE SNOW-PARTRIDGE.

Lerwa lerwa, Fauna B. I., Birds, 2nd ed. vol. v, p. 433.

The Snow-Partridge is found in the Himalayas over a wide range extending from Afghanistan and Baluchistan East through Kuman, Nepal, Sikkim, and Southern Tibet to Ta-t sien-lu and Moupin in Western China.

In the Western Himalayas it is only found over a comparatively narrow belt as far East as Nepal and Sikkim. Even in Central Tibet it is confined to the South but, farther East, it may occur over a broader belt, as it was seen and heard by Bailey over a very wide area.

It is a bird of high elevations. Whymper in Garhwal got many nests at about 14,000 feet in the Nila Valley, while Whitehead got one nest in the Khagan Valley between 12,500 and 14,000 feet.

In Hume's time the eggs were unknown but Wilson gave Hume the following note on their habits in Garhwal, since confirmed by Whymper :—"It breeds on the high ridges jutting from the snow at elevations of from 12,000 to 15,000 feet where the ground is tolerably broken and roughish, neither very rocky nor on what we call slopes. The hills between the head-waters of the Ganges and Jumna, and Tonse, are favourite breeding grounds. The chicks have been first observed about the 20th June."

The first record I can find of its nest and eggs is that of Whymper, who writes (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 990, 1911) :—"I found four nests during June (1909) at between 13,000 and 14,000 feet; five eggs appear to be the full clutch and eggs were hard-set by the end of June, newly hatched chicks being seen rarely in July. The nests were all placed under overhanging ledges and were pretty well lined with moss and leaves; they are well concealed and the bird sits very close, but the cock-bird rather gives away the nest by calling and strutting about in its vicinity; however, they take a lot of finding even then."

In 1910 Whymper again took eggs and nests, and in sending them to me he again comments on the nests—"made of grass, leaves and always some dry moss, quite good nests." Some of the nests taken by him were built "under the shelter of coarse tussocks of grass, always well concealed."

They do not keep to quite such bare stony hill-sides as the Snow-Cock does and they are often found on such as are fairly well covered with grass and with a good many bushes, interspersed here and there with stony bare patches. They have also been found in Juniper but this seems to be exceptional.

Rattray found a nest at Mangtba at about 10,000 feet, which is the lowest elevation at which it has been known to breed, while Buchanan took another at Parachinar at about 11,000 feet.

The breeding season, so far as is known at present, mostly from the records quoted above, is from the end of May to the middle of July.

The full clutch numbers three to five, possibly sometimes six or seven, as Wilson refers to seeing this number of chicks in a covey.

The eggs are very like small editions of those of the Snow-Cock. The ground varies from pale clear buff or yellowish-buff to a dirty dark grey-buff, the latter looking as if they were very much soiled and stained, though the effect is undoubtedly due to the actual colour. The markings consist of fine frecklings and tiny blotches of reddish distributed freely over the whole surface. In a few eggs the blotches are rather larger and bolder but fewer, and in such cases stand out well from the ground-colour. Under a glass one can see a few secondary blotches of blue-grey but they are not noticeable otherwise.

The texture is rather coarser in proportion to their size than in *Tetraogallus* eggs and the surface has little or no gloss.

Fifty eggs average 54.6×35.4 mm. : maxima 57.2×35.5 and 54.7×37.0 mm. ; minima 48.6×31.6 mm.

Except that they are monogamous we know little about their habits after the chicks are hatched. The coveys unite while the chicks are still very young and the male seems to take quite as much interest in them as the female does.

Suborder PERISTOROPODES.

Family MEGAPODIIDÆ.

(MOUND-BIRDS or MEGAPODES.)

Megapodius nicobariensis.

THE MEGAPODE.

(1994) *Megapodius nicobariensis nicobariensis* Blyth.

THE NICOBAR MEGAPODE.

Megapodius nicobariensis nicobariensis, Fauna B. I., Birds, 2nd ed. vol. v, p. 437.

This extraordinary bird is found in all the islands of the Nicobars except Choura and Car Nicobar. Butler obtained them in Battye Malve, while Hume saw traces of their mounds on Table Island

from which, however, they now seem to have completely disappeared. The birds of the Great Nicobar and Little Nicobar are of the next following race.

The Megapodes frequent the dense forest growing a little above high-water mark along the shores of nearly all the islands of the group, never leaving it during the day but feeding on the shores during the night.

Davison writes of these birds ('Stray Feathers,' ii, pp. 276, 499):—"The Megapode never wanders from the sea-shore, and throughout the day keeps to the thickest jungle, a hundred yards or so above high-water mark. It never, so far as I observed, emerged on to the open grass hills which form so conspicuous a feature in so many of the Nicobars, but throughout the day hugged the belt of the more or less dense jungle that in most places, along the whole coast-line, supervenes abruptly on the white coral beach."

As regards the nidification, it is impossible to improve on the accounts given by Davison, together with Hume's comments thereon. The former notes:—"I have seen a great many mounds of this bird; usually they are placed close to the shore, but in Bompoka and in Katchall I saw two mounds some way inland in the forest; they were composed of dry leaves, sticks etc., mixed with earth, and were very small compared with others near the sea-coast, not being above three feet high and 12 or 14 feet in circumference; those built near the coast are composed principally of sand, mixed with rubbish, and varied greatly in size but average about 5 feet high and 30 feet in circumference, but I met with one exceptionally large one on the island of Trinkut, which must have been at least 8 feet high and quite 60 feet in circumference. It was apparently a very old one, for from near its centre grew a tree about 6 feet in diameter, whose roots penetrated the mound in all directions to within a foot of its summit, some of them being nearly as thick as a man's wrist; I had the mound dug away almost to the level of the surrounding land, but only got three eggs from it, one quite fresh and two which had the chicks somewhat developed.

"Off this mound I shot a Megapode which had obviously just laid an egg; I dissected it, and from a careful examination it would seem that the eggs are laid at long intervals, for the largest egg in the ovary was only the size of a large pea and the next in size about the size of a small pea.

"The eggs are usually buried 3½ to 4 feet deep, and how the young manage to extricate themselves from the superincumbent mass of soil and rubbish is a mystery.

"The surface soil of the mounds only is clay; at about a foot from the surface the sand seems slightly damp and cold, but as the depth increases the sand gets damper but at the same time increases in warmth."

Commenting on this Hume writes:—"I saw a considerable number of these mounds. It appears to me that the birds first

collected a heap of leaves, cocoanuts, and other vegetable matter, and then scraped together sand which they threw over the heap, so as not only to fill in all interstices, but to cover everything with a foot of pure sand, which consists principally of triturated coral and shells. After a certain period, whether yearly or not of course I cannot say, the birds scrape away the covering sand-layer from about the upper three-fourths of the mound, cover the whole of it over with vegetable matter, and then cover it over again with sand. In the large mound, an old one into which I cut a narrow section from centre to margin, this arrangement was very perceptible; in it I thought I could trace, by the more or less wedge-shaped portions of pure sand along the base, the remnants of successive outer coverings of sand, the basal portions of which have never been removed, ten or perhaps eleven successive renovations of the mound; even the central portion was perfectly cool. The vegetable matter had in great part disappeared, leaving only the hard woody portions behind, but showing where it had been by the discoloration of the sand. The decay of the vegetable matter and the bird's habit of not removing the basal portion of the sandy covering at each renovation explain why the mounds increase so much more in radius than in height.

"A small mound contained a much greater mass of vegetable matter and was sensibly warm inside. I believe that the bird depends for the hatching of its eggs solely on the warmth generated by chemical action. The succulent decaying vegetation, constant moisture, and finely triturated lime, all combined in a huge heap, will account for a considerable degree of artificial heat."

Davison thought that only one pair of birds used each mound but Hume thought otherwise, as on one occasion twenty eggs were taken from the same heap and the Nicobarese told Hume that after one pair had started a heap the birds hatched from it returned to it to lay.

As Hume once obtained an egg on a mound, the hole for its interment still uncompleted, it is evident the bird first lays the egg on the mound and then scratches out the deep hole into which it is dropped, after which the hole is filled in again.

We do not know yet whether the old birds pay any attention to the eggs after deposition or to the chicks when hatched. Butler says (*Journ. Bomb. Nat. Hist. Soc.* vol. xii, p. 689, 1899) that the young find their way out of the mound unaided. "For one thing the birds could never know when to dig down to save a newly hatched young one from suffocating; further, the eggs can be hatched by packing them in a box in the material of the mound in which they are found, and Mr. E. H. Man, who hatched a chick on his verandah by this means, told me that it not only extricated itself from the sand, but flew up on the verandah railing directly it was approached."

Eggs seem to have been taken at various odd times, so it is difficult to suggest what is the breeding season. Possibly it is more or less

all the year round, the eggs being laid at long intervals which may run from ten to twenty days. Again, though eggs have been hatched in houses by various people, there is nothing on record as to the period of incubation. Judging from examinations made of the ovaries and from the fact that Hume found twenty eggs in a mound in various stages of incubation, it would appear that a hen lays four or five eggs only but, at present, this is little more than speculation.

The eggs are enormous for the size of the bird and are in shape long ellipses. The texture is smooth when fresh but often soon becomes flaky, looking as if the surface-colour was coming off in flakes. The grain is soft, rather porous and, for the size of the eggs, the shell is brittle. Newly laid eggs are a really wonderful brick-pink, rosy pink or salmon-pink; this gradually changes to a dull buff or ochre-brown, often much flecked with white and, eventually, the eggs become a uniform dull white.

Eighty-four eggs average 82.6×52.3 mm. : maxima 85.5×50.3 and 82.0×57.1 mm. ; minima 76.4×49.9 and 81.6×46.2 mm.

The chicks hatch out fully fledged and at once join their fellows in the forest, where one sees flocks consisting of birds of all ages.

Whether these birds are monogamous, bigamous or polyandrous there is no evidence and, possibly, they are quite promiscuous.

(1995) *Megapodius nicobariensis abbotti* Oberholser.

THE GREAT NICOBAR MEGAPODE.

Megapodius nicobariensis abbotti, Fauna B. I., Birds, 2nd ed. vol. v, p. 439.

This race of Megapode is restricted to the Great and Little Nicobar Islands, South of the Nicobar group.

Having given the distribution of this Megapode there is nothing to add, as all their habits, nidification etc. are exactly the same, so far as is known, as those of the preceding bird.

The only eggs I have seen are four taken by B. B. Osmaston on the Great Nicobar; these are very washed out, almost white eggs, like those of the Nicobar bird in similar condition. They measure 84.0×50.0 ; 85.2×52.0 ; 83.0×47.5 and 81.1×50.2 mm.

They were taken in April 1905.

Order VII. HEMIPODII.

(BUSTARD-QUAILS.)

Family TURNICIDÆ.

(BUSTARD-QUAILS.)

Turnix suseitator.

THE JAVAN BUSTARD-QUAIL.

(1996) **Turnix suseitator leggei** Stuart Baker.

THE CEYLON BUSTARD-QUAIL.

Turnix suseitator leggei, Fauna B. I., Birds, 2nd ed. vol. v, p. 442.

As its name implies, this Bustard-Quail is confined to Ceylon.

The nidification, habits and eggs of all the Bustard-Quails are similar, though the latter may vary somewhat in depth and richness of marking and, of course, in size.

The habits and nidification are dealt with very fully under the next form, well known to me personally and, therefore, they need not be repeated for each race.

The present bird is found over the greater part of the plains of Ceylon and ascends the hills as high as 4,000 feet but is less common above about 2,000.

The nest is made in a hollow scratched out by the birds themselves in almost any kind of cover, often in gardens and parks, the bush and scrub round villages or between patches of cultivation. Tea-gardens and rubber plantations are also favourite breeding resorts.

The normal number of eggs in clutches of Bustard-Quails is four, but the Ceylon race often lays three only while, according to Wait, the birds sometimes incubate two.

Wait and Phillips between them have taken eggs in every month of the year.

The eggs resemble those of the Burmese Bustard-Quail in all respects.

Forty-seven eggs average 23.3×19.1 mm. : maxima 25.3×19.1 and 24.2×19.6 mm. ; minima 22.0×17.3 mm.

(1997) *Turnix suscitator plumbipes* (Hodgs.).

THE BURMESE BUSTARD-QUAIL.

Turnix suscitator plumbipes, Fauna B. I., Birds, 2nd ed. vol. v. p. 445.

The distribution of this Bustard-Quail extends from Sikkim to the hills of North-West China. It occurs over the whole of the Nepal and Sikkim Terai, the Bengal Dnars and the whole of Assam. It is found over most of the better wooded, wetter parts of the districts South of the Himalayas from Bihar to Mymensingh, Chittagong, Tippera and Northern Arakan. In the drier Southern districts of Northern India, Bengal and Bihar it meets and intergrades with *laijoor* of Southern India.

Given sufficient cover, this Bustard-Quail may be found in almost any kind of country and it occurs from the plains up to some 8,000 feet. I have never found it breeding in deep evergreen forest nor will it be found nesting in very dry, open waste areas. Occasionally its nest may be placed at the edge of evergreen forest where this borders on cultivation or grass-land; often it nests in bamboo-jungle, scrub, secondary growth or in deserted cultivation, especially in patches of deserted cotton-fields. Above all other places, however, it loves grass plains which are broken up by stretches of forest, bamboo-jungle or practically bare tracts. Wherever, however, it may be found it is usually not very far from water, for they are thirsty little birds, watering regularly several times a day.

The nests, of which I have seen many hundreds in various parts of Assam, are almost invariably in hollows, a few of which are natural but, in most cases, are scratched out by the birds. In Assam there is always a lining of some sort. Sometimes this is merely a bed of grass and leaves but, more often, it is a well-made pad of grasses, both blades and stems, some $3\frac{1}{2}$ to $4\frac{1}{2}$ inches in diameter and from $\frac{1}{2}$ to $1\frac{1}{2}$ inch thick, while in many nests the grass at the edge turns up to form a little eup for the eggs to rest in. Sometimes, also, especially when the grass-growth round the nest is dense yet fine, it is worked out into a canopy overhead, while in other nests the entrance is through a little tunnel in the grass. The canopy, perhaps, is a work carried out more by accident than design by the birds burrowing in among the grass-roots and constantly turning round on the eggs and I have never seen any attempt at weaving such as is sometimes carried out by the Wood-Partridges. In many nests only the softer blades of grass are used in strips and the harder, coarser mid-ribs are discarded, while in other nests any kind of grass is employed. Occasionally, also, one may find scraps of bracken, fern, and even strips of bamboo-leaf in the nest, though this is very rare. Grass-roots and tendrils, however, are often made use of.

In North Cachar the birds were very fond of nesting in the so-called roads. These were merely tracks about 6 feet wide cut through the jungle and cleared for the cold weather. When, however, the rains started the grass quickly grew up and nearly obliterated the road with the exception of a hardened path a few inches wide in the centre. Many times I have seen nests within a few inches of this path or have seen the little bird leading his four chicks along it.

In India Hume says that often the eggs are laid on the bare ground, but he lumps all the races together and what may be true of *taijoor* in India may not be correct in regard to other races.

This race seems to breed more or less all the year round, but there are two principal periods, first in April and May and then in August and September.

The full clutch of eggs is four and any other number, more or less, is abnormal. In the many hundreds of clutches I have seen, not necessarily taken, I have seen one clutch of six and perhaps four clutches of five eggs. Speaking of Bustard-Quails generally, Jerdon mentions a clutch of eight eggs, while Hume among thirty clutches found one six and two of five eggs. Three only is just as rare as more than four.

In shape the eggs of the Bustard-Quails are broad ovals, generally obtuse, rarely pointed at the smaller end. The texture is hard, close and rather fine, the surface smooth and often strongly glossed.

In most eggs the ground-colour is a pale grey, sometimes tinged yellowish or reddish, while they vary from this to a medium brown or reddish-brown. The markings vary from tiny specks and dots of yellowish-brown, reddish-brown or black to blotches of the same. In many eggs the tiny specks cover the whole surface equally from end to end but, when the blotches are bigger, they are generally confined to the larger end and occasionally become indefinite rings there. Some of the more heavily blotched eggs are quite handsome, especially when the marks are deep black on a reddish ground. The secondary marks are pale lavender but are generally invisible without a strong glass, though I have a few sets having a very pale ground which are boldly blotched with primary markings of black and large secondary ones of lavender, showing up well.

Sixty eggs average 24.9×20.2 mm.; maxima 27.5×20.8 and 25.3×20.9 mm.; minima 22.1×17.0 mm.

In the Bustard-Quails the dominating partner is the female, who hesses all the domestic arrangement but does none of the work beyond lay the eggs. It is the lady who fights for her husband, challenges other ladies to mortal combat for him, and then, as soon as she has laid her four eggs, deserts him and seeks another. The male bird makes the nest, incubates the eggs and brings up the chicks.

The challenge of the female and the love-call to her mate seem to be one and the same. Seth-Smith in the 'Avicultural Magazine' thus describes the booming:—"The call-note uttered by the *Hemipodes* seems to be much the same with all,—a soft booming

which is more or less ventriloquial. The female utters the note far more frequently than the male, and I am not sure that he calls at all, but I believe he does occasionally. The note may be almost called a 'Coo'; I have frequently mistaken it for the coo of the Bronze-winged Pigeon in the distance. Some writers have likened it to the distant bellowing of a bull, and the Mediterranean form, *T. sylvatica*, is known as 'Torilla' or 'little bull.' "

The call is not unlike the deep guttural purr, or grunt, of a tiger, and sometimes when hurrying along a lonely jungle-track in the dark it would give one quite a jump as it came soft and deep from just behind.

As a rule the female mounts a convenient hillock or termite mound to boom, but I do not think she ever gets into a tree or on a stump for this purpose. Her attitude when booming is crouched low on the ground with wings half outspread and gently quivering. If a female answers the call and approaches, the two rush at each other and a first-class fight ensues, in which the two birds get so interested that it is easy to catch both by throwing a cloth over them. I once saw a male answer to the booming of a tethered female, when his modest demeanour was most amusing. There was no cooing or purring on his part, but he slunk up towards the female in the little open space where she was pegged down and then squatted, 5 or 6 feet away, back towards her. For a few seconds the lady lay and boomed, and then, seeing he would not approach nearer, she tried to advance to him and, when held back by the string, danced, bowed and scraped to him in a perfect ecstasy, until finally he began to sidle towards her, a few inches at a time, coyly looking away as he did so until he stepped into a noose and was caught.

I have kept these Quail in captivity but they never got nearer breeding than the casual dropping of eggs anywhere on the ground.

In the wild state the hen will often lay three or more clutches of eggs in a season, all within quite a small distance of one another, the eggs showing, by their remarkable similarity, that they are evidently the produce of one bird. This seems to be confirmed by the fact that often the nests are very close together, though the hens are much too pugnacious for this to happen if laid by different individuals. They are so pugnacious that it is impossible to keep breeding hens together, though the males are quite friendly.

(1998) *Turnix suscitator taijoor* Sykes.

THE COMMON INDIAN BUSTARD-QUAIL.

Turnix suscitator taijoor, Fauna B. I., Birds, 2nd ed. vol. v, p. 447.

This race of Bustard-Quail is found over the whole of India, South of the habitat of *T. s. plumbeipes* to Cape Cormorin. It does not

occur in Sind, and in Hume's time had not been recorded from the Punjab but, since then, I have had specimens sent to me with the eggs, though it is only a rare breeding straggler in that province.

Except that, according to Hume, this bird often lays its eggs on the ground without any attempt at a nest, there is nothing to add to what has been already noted about the Northern bird. Davidson in Khandesh and Bourdillon in Travancore also say that they have sometimes taken eggs laid on the ground with no nest.

Sixty eggs average 24.7×19.4 mm.: maxima 26.5×20.1 and 23.9×20.4 mm.; minima 23.0×18.1 and 24.2×17.9 mm.

(1999) *Turnix suscitator blakistoni* (Swinhoe).

THE CHINESE BUSTARD-QUAIL.

Turnix suscitator blakistoni, Fauna B. I., Birds, 2nd ed. vol. v, p. 448.

The Chinese bird is found over the greater part of South and Western China and, within our limits, is common in the Shan States to Karen-ni.

Harington and Cook took a great number of nests of this Bustard-Quail which came into my possession after their deaths, but I have no notes to show that the nidification differs in any way from that of the other Bustard-Quails. The eggs have been taken from the 24th February to the 21st July.

Later Livesey obtained nests in April and May in the Southern Shan States and says that the nidification is just like that of the Indian bird.

Thirty-two eggs average 24.1×20.4 mm.: maxima 27.2×21.1 mm.; minima 22.1×19.0 and 24.0×18.3 mm.

(2000) *Turnix suscitator bengalensis* Blyth.

THE CALCUTTA BUSTARD-QUAIL.

Turnix suscitator isabellinus, Fauna B. I., Birds, 2nd ed. vol. v, p. 448.

Turnix suscitator bengalensis, *ibid.* vol. viii, p. 692.

Described first from Calcutta, this Bustard-Quail is common in the districts round that city, *i. e.*, 24th Parganas, Hoogly and Nadia, though less so in the two latter than in the first.

Jerdon and Parker took many nests round Calcutta in July and August and I took or saw many elsewhere, from the end of June to September, and it is possible that this bird has a restricted breeding season lasting during the Monsoon.

Sixteen eggs average 23.8×19.1 mm.: maxima 25.6×20.8 mm.; minima 23.1×18.1 mm.

(2001) *Turnix suscitator interrumpens* Rob. & Stuart Baker.

THE TENASSERIM BUSTARD-QUAIL.

Turnix suscitator interrumpens, Fauna B. I., Birds, 2nd ed. vol. v, p. 449.

The range of this subspecies is roughly from latitude 20° in the North to Tenasserim and peninsular Siam.

Herbert found this Bustard-Quail breeding in Siam during June, July and August and gives the average size of the eggs taken by him as 23.5 × 20.0 mm.

(2002) *Turnix suscitator pallescens* Rob. & Stuart Baker.

THE PEGU BUSTARD-QUAIL.

Turnix suscitator pallescens, Fauna B. I., Birds, 2nd ed. vol. v, p. 450.

This pale form of Bustard-Quail is restricted to the dry zone of Central Burma, approximately from Rangoon to Thayetmyo and Tounghoo but not, so far as yet known, crossing the Sittaung.

Oates took the eggs of this Quail in Pegu in August and Hopwood and Mackenzie took others between June and August but I have seen no records of measurements.

Turnix sylvatica Desfontaines.

THE EUROPEAN BUTTON-QUAIL.

(2003) *Turnix sylvatica dussumier* * (Temm.).

THE INDIAN LITTLE BUTTON-QUAIL.

Turnix dussumieri, Fauna B. I., Birds, 2nd ed. vol. v, p. 450.

This tiny bird ranges over practically the whole of India from 8,000 feet in the outer ranges of the Himalayas South to Travancore, where Stewart twice found it breeding. It even occurs in Sind fairly commonly in years of good rainfall and is common in all parts of Assam. In Burma records are somewhat scattered and scanty but it seems to occur almost everywhere. Oates obtained it in Pegu, Herbert records it as not uncommon around Bangkok in Siam, while Swinhoe found it in Formosa and Hainan. In the Chin Hills and Upper Chindwin it is not rare and I have eggs obtained there by Hopwood and Mackenzie.

They breed more or less all the year round but nine out of ten females lay after the rains break, about the 15th May, and eggs

* This little Quail is now generally accepted as being only a race of the European Bustard- or Button-Quail. The proper spelling of the subspecific name is *dussumier*, without a terminal *i*.

may be found from then on to Christmas. Inglis and Coltart found quite a number breeding in Bihar in March and April but here also the majority breed later on during the rains.

The eggs, always four in number, are miniatures of those of the preceding species but, as a series, are more handsome, more boldly blotched and generally more densely marked. At the same time all the variations which occur in the eggs of the bigger species may also be found in the eggs of this.

Sixty eggs average 21.3×17.3 mm. : maxima 23.2×19.2 mm. ; minima 19.7×15.9 mm.

In their nuptial and post-nuptial relations there is nothing to add to what has been written about the bigger birds. Small though the little lady may be, she is just as pugnacious as the others and just as great a bully to her little husbands.

Turnix tanki*.

THE LARGER BUTTON-QUAIL.

(2005) *Turnix tanki tanki* Blyth.

THE INDIAN LARGER BUTTON-QUAIL.

Turnix maculatus tanki, Fauna B. I., Birds, 2nd ed. vol. v, p. 454.

This Button-Quail is found over the greater part of India but does not occur in Ceylon. It appears to be only a straggler into the Punjab during the rainy season. It is found throughout Bombay and North-West Provinces and thence everywhere East to Eastern Bengal and Assam, North of the Brahmapootra and West of the Dibong. South of the former and East of the latter river it is replaced by the next bird. South, Bourdillon found it breeding in South Travancore ; I have had birds and eggs sent from Mysore and also from Tinnevely in the South Madras Presidency. I do not think it occurs anywhere in the districts of Bengal East of the Bay, where it is replaced by *blanfordi*.

This bird breeds, generally speaking, after the rains break in June and most lay during August and September and on to November. A few birds lay at other times. Bourdillon took eggs on the 3rd January ; there are some of Hume's eggs in the British Museum taken in April and I have taken them in Tezpur in May and June. In Bihar, although Coltart and Inglis have taken eggs occasionally in the first half of the year, the vast majority of Quail breed from July to October.

I think these Button-Quails prefer wide stretches of grass-land to any other kind of country for breeding purposes but their

* Peters ('Check-list,' vol. ii, 1934) shows that *maculatus* is a synonym of *maculosa* ('Avifauna Timor,' 1914, p. 94) and, therefore, cannot be used.

nests have been found in all the different types of cover already enumerated.

The nest is quite typical and varies from no nest beyond a scrape to the well-made, semi-domed affair already described.

The eggs are also quite typical in all their variations and call for no further remark.

Sixty eggs average 22.8×17.9 mm. : maxima 24.4×19.0 and 24.2×19.1 mm. ; minima 20.1×17.1 and 22.0×16.8 mm.

There is nothing to record about their habits, display etc. which differs from those of the other species and subspecies of the genus.

(2004) *Turnix tanki blanfordi* Vieill.

THE BURMESE BUTTON-QUAIL.

Turnix maculatus maculatus, Fauna B. I., Birds, 2nd ed. vol. v, p. 453.

The Burmese form of Button-Quail occurs from Assam in the Surrma Valley, throughout the whole of Burma and the Shan States, and thence into China and Manchuria.

Except that this little bird keeps very closely to grass-land there is little to note about its habitat or habits. In the hills of Assam, where it occurs up to 7,000 feet, it is very common in the immense grass tracts both in the plains and in the hills. At the same time it is found in every conceivable class of jungle except deep evergreen forest, into which it seldom wanders far.

It breeds almost exclusively from May to August but nests may be found here and there throughout the year and I have myself taken them in every month except November, December and January.

The nests are quite typical but well made ; domed nests are, perhaps, more common with this species than with any other.

The eggs, always four in number and very rarely five or six (one instance only), are exactly like those of other species of the genus.

One hundred eggs average 25.5×20.8 mm. : maxima 28.1×21.1 and 27.0×22.2 mm. ; minima 22.0×20.0 and 25.3×18.8 mm.

In its nidification and habits there is nothing to note beyond what has been already said of other species and subspecies.

Order VIII. GRALLÆ.

Suborder FULICARIÆ.

Family RALLIDÆ.

(RAILS, MOORHENS etc.)

Rallus aquaticus.

THE WATER-RAIL.

(2007) *Rallus aquaticus korejewi* Sarudny.

THE TURKESTAN WATER-RAIL.

Rallus aquaticus korejewi, Fauna B. L., Birds, 2nd ed. vol. vi, p. 6.

This Rail breeds in Turkestan, Transcaspia and Persia to Kashmir and Ladak but, apparently, not Tibet. When I wrote about *Rallus indicus* in the 'Game-Birds' series it was generally accepted, if only provisionally, that this was the race of Rail breeding in Kashmir; now we know that the form is *korejewi*, and what was then written about *indicus*, in so far as it relates to its breeding in India, really refers to the present form.

They breed either in, or close to, the great swamps and lakes with which Kashmir is so well provided, at all elevations above some 4,500 feet, where such lakes exist. Ward, Betham and Osmaston have taken the eggs in Kashmir, mostly in the Hokra Jheel, which is about 5,200 feet elevation. As a rule the birds keep to the big swamps for breeding, placing their nests in the great reed-beds round the fringe of the water or in the weed- and reed-covered islands in the lakes themselves; occasionally, however, they build them in ditches and waterways leading to the lakes and sometimes in lush grass and thickly growing weeds in wet meadows a considerable distance from the lakes. The nests are almost invariably very well concealed, being placed well inside herbage of some kind, such as long rank grass, beds of weeds, in among long reeds growing in, or next, the water or in amongst, or under, masses of debris which have collected on the sides of ditches, ponds or lakes. Often the nests are built in reed-beds standing in water, in which case they generally

rest on the broken-down reeds which usually form a matted bed in among the roots of all reed-beds which have not been burnt down. The nest itself is very loosely put together, a pad of dry rushes, aquatic weeds and grass, without any true lining, though the inner portion may be made of somewhat softer and more pliant material than the base and body of the nest. Very often, especially when the nest is built in reed-beds, it is composed solely of the bulrush-leaves or of reeds and bulrushes, with an upper bed, one can hardly call it a lining, of grass. Sometimes the nests are of considerable size, measuring as much as a foot across by 6 inches in depth. The majority, however, are little more than half these dimensions, with an internal cup roughly about 5 inches across by 3 inches or less in depth.

In Kashmir the birds breed in June and July, sometimes a little earlier, sometimes later. I have eggs in my own series dating from 29th May (Betham, Srinagar) to 15th August (Osmaston, Hokra Jhil).

The number of eggs laid is probably six or seven as a rule but Osmaston took one clutch of ten, though the parent bird when trapped on the nest broke three of these. Betham took four eggs showing signs of incubation, so this number must sometimes form a complete clutch.

In shape the eggs are long ovals, rarely rather broader, the small end, though not actually pointed, being distinctly compressed. The texture is fairly fine and close and the surface smooth and sometimes highly glossed.

In colour they range from a pale creamy buff to a fairly warm pale buff. I have seen one clutch with a faint green tinge and one of Osmaston's, taken in the Hokra Jhil, is a pearly white, also with the faintest possible tinge of grey-green. The markings vary from tiny flecks to small blotches of pale reddish-brown, purple-brown or pale brick-red, sparse everywhere but less so at the larger end. The secondary markings of lavender or pinky grey are similar in size and distribution.

Fifty eggs, all taken in Kashmir, and most by Osmaston (B. B.), average 36.2×25.9 mm. : maxima 40.7×26.0 and 37.9×28.1 mm. ; minima 32.8×24.6 and 33.5×23.0 mm.

Both birds assist in making the nest and both take part in incubation but, probably, the hen-bird does most of this, as does the European bird. She is hard to catch on the nest, sneaking off very quietly on the approach of anyone near to it, creeping through the grass and weeds until she has got some way from the nest and then rising and fluttering away. The period of incubation is not known either in regard to this bird or the European one.

Hypotænidia striata (Linn.).**THE BLUE-BREASTED BANDED RAIL.**(2008) **Hypotænidia striata gularis (Horsf.).****THE INDIAN BLUE-BREASTED BANDED RAIL.***Hypotænidia striata gularis*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 7.

This Javan form extends from Java, South China and Hainan, through the Indo-Chinese countries, and then throughout the whole of India, Burma and Ceylon, wherever there are suitable lakes, swamps or marshes.

There seems to be nothing to show to what height in India this bird ascends hills where there is ample water for it. I have seen it in North Cachar up to 3,000 feet in some small swamps in grass-land but I do not think it bred there. I can find no record of its occurrence in the great lakes of Kashmir but Darling took its nest in the Wynaad at about 2,000 feet, while in Ceylon T. E. Tunnard and Miss Cecily Kershaw found it breeding at 4,000 feet near Hatton.

This is one of our most common Indian Water-birds, and they breed in the huge swamps which are found everywhere in India and Burma in the wetter districts. Nor are they confined to these, for almost every village pond has its pair, which get very tame and confiding. In desert countries and even in the drier districts it does not occur, and it is not met with in Sind, or in the desert area of Rajputana.

As a rule the nest is placed well inside a swamp where there are plenty of weeds and vegetation or among the reeds, grass or bushes on the edge. Sometimes they breed in rice-fields and at other times on the banks between the fields. Occasionally I have seen nests situated at a considerable distance from water but always in thick cover of some sort. A pair built every year in the District Police-Officer's garden in Jalpaiguri, the nest being placed in a quite dry ditch running alongside a thick hedge which separated his compound from the next. Every year five or six eggs were laid but never more than one or two of the chicks reached maturity and often none. I have seen one or two nests built in meadows of luxuriant grass a hundred yards or more from a pond, while Coltart and I both found nests in a reedy lake entirely surrounded by dense evergreen forest near the Dihing River. In Silchar they also breed in a large shallow swamp just behind the military cantonments, one nest being placed within a few feet of a track used every day by dozens of passers-by.

The nest, nearly always very well concealed, may be placed actually on the ground, or in swamps resting on weeds or among the reeds some inches above the water. Some nests are very bulky and are quite well built, being composed of reeds, weeds and grass

well matted together and lined with dry grass. Such nests may measure as much as 10 inches across, while the depth depends on its situation, those in dry ground being only an inch or two deep, while those among weeds in wet positions may be as much as a foot, though generally only some 4 to 8 inches. When built in reeds it sometimes rests on the broken-down débris and at other times is hidden in it; these nests vary from about 5 to 8 inches across and 2 to 5 in depth.

The breeding season begins after the rains commence in the middle of June and continues until September but I have taken eggs from early June to the end of October. The season seems to depend entirely on the rainfall, for in Assam a few birds commence laying in the end of May in years when the early May rains are excessive. On the other hand, when the rains break late in June, and then in small falls which do not suffice to fill in the swamps, the birds may delay laying until August and September.

In Burma they breed principally from July onwards; Wardlaw Ramsay says in Tounghoo they lay in August and September, Oates in Pégú gives 1st July to 11th October, Harington and Grant the same for Maymyo, while Mackenzie and Hopwood took the eggs from early July onwards in Tenasserim.

Five to seven eggs are most often laid but the number varies from four to nine, though I have never personally taken the latter number.

The eggs are decidedly handsome. The ground-colour varies from a cream, so pale as to appear almost white, to a warm salmon-buff. The markings consist of blotches and spots of reddish-brown, purplish-brown or deep red, sometimes small, sometimes large and bold, scattered thinly over the whole surface and frequently more numerous at the larger end, though they seldom form rings or caps. In a few pale eggs the markings are a pale dingy red and in one curious clutch of eggs with an ivory-white ground there are only a few tiny specks of pale red, almost invisible from a little distance.

In shape they are broad ovals very little compressed at the smaller end; the texture is strong, fine and close and the surface smooth, often with a fair gloss.

Two hundred eggs average 33.7×25.8 mm.: maxima 36.6×28.6 and 36.3×28.8 mm.; minima 30.6×25.0 and 32.9×23.9 mm.

The male assists the female in bringing material for the nest and also in doing some of the incubation, but most of his time is spent wandering about in the vicinity of the nest in the hope of a mild scrap with another male of his own kind. I have seen several of these fights but they are never very serious, the intruding male always quitting after a round or two.

The nuptial display is one which seems common to most of the Rails. The male approaches the female with drooping, quivering wings, the tail held almost erect and constantly flicking forward over his back, whilst the head is held low and stretched out parallel to the ground. When within a foot or two of the female he stops, jerks himself upright on his toes, spreads out his wings and in a

moment or two crouches again. Sometimes this performance is continued again and again, while at other times the female lies down and at once accepts the attentions of the performer.

Incubation is said to take from nineteen to twenty-two days but I have no personal knowledge of this. The chicks in a very few hours can run at a great pace and swim well.

The sitting bird is difficult to catch on the nest, nearly always creeping off before she can be spotted.

(2009) *Hypotaenidia striata obscuriora* Hume.

THE ANDAMAN BLUE-BREASTED BANDED RAIL.

Hypotaenidia striata obscuriora, Fauna B. I., Birds, 2nd ed. vol. vi, p. 9.

This Rail is confined to the Andamans and Nicobars.

Butler (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 693, 1890) gives the following description of this Rail's habitat and nesting habits:—"Common to both groups, but a very skulking bird and seldom flushed. It frequents forest a good deal, as well as paddy land, marshes etc., and I caught several in thick jungle.

"This rail breeds more or less throughout the year. I have known of nests in June, July and November in the Andamans and took a nest on Car Nicobar on August 30th. The nest is a mere pad of grass etc., placed anywhere in thick grass or herbage, either in the open or in the jungle. The eggs are 7 or 8 in number."

Osmaston (B. B.) adds to this (*ibid.* vol. xvii, p. 489, 1906):—"Very common in marshy meadows and reedy swamps. I found a number of nests in tufts of grass and rushes in swampy ground between June 15 and August 15. The nest is merely a pad of dry grass usually well concealed in the rushes. Six eggs appear to be the full complement."

One clutch of eggs sent to me by Osmaston is said to have been taken on the 8th June. Six eggs is, as Osmaston observes, the normal full clutch and Wickham and Anderson never took more—so Butlers' eight and nine must have been quite exceptional.

The eggs cannot be distinguished from those of the Indian bird but, viewed as a series, are still more handsomely marked and richly coloured.

One hundred and fifty eggs average 36.0×27.5 mm.; maxima 39.2×28.7 and 37.0×29.4 mm.; minima 32.7×25.0 mm.

(2013) *Porzana pusilla pusilla* (Pallas).

THE EASTERN BAILLON'S CRAKE.

Porzana pusilla pusilla, Fauna B. I., Birds, 2nd ed. vol. vi, p. 14.

This pretty little Rail is found from Afghanistan, East to the Indo-Chinese countries and all China. In India it breeds in great

numbers in Kashmir and quite possibly over a great part of the plains as Hume and Brooks took a nest with three fresh eggs in the Achulda Jheel near Etawah, while Butler took another on the 28th September at Milana, 18 miles East of Deesa.

In Bengal and Assam, though common enough in Winter, I do not think it breeds, for I have made very special searches for it in the most likely places.

Hume gives its maximum breeding elevation as 4,000-5,000 feet and it is common below Simla at this height. It is, however, almost equally common on the Gunderbal Lake and also in the Simla States well above this height and probably up to 7,000 feet.

In the Hokra and some of the other lakes in Kashmir it is very common indeed and, in that state, seems to keep very closely to the lakes and their immediate surroundings, but elsewhere it breeds in small pools, rice-swamps and rice-fields. Thus Hume found a nest at Syree, below Simla, "in amongst rushes and sedges on the margin of a small swampy pool encircled by rice-fields."

Most nests in Kashmir are placed in the reed-beds which surround the lakes in that country; others are built on the floating islands of weeds while, occasionally, they are placed in the long grass growing at a little distance from the lake. Those in the reed-beds are situated within a few inches of the water, some with the bottom actually resting in it, though most are so built that they lie on the tangle of broken-down reeds and débris which mat the lower parts of the reeds.

An unusual situation is recorded by Butler, who found a nest in a small clump of bulrushes on a bank, three or four feet above the level of the water. When built on the islands they are well concealed in the grass and weeds and are often very difficult to get at owing to the treacherous surface letting one through if attempts are made to walk on them, while no boat can push through the mass. If placed in the luxuriant meadow-grass they are equally well hidden and are often placed close to an extra long tuft of grass, a bush or some prominent weed which serves as a land-mark for the birds.

The nest itself is generally little more than a pad of grass, rushes and reeds, 6 inches or so across and 2 or 3 deep. When, however, it is built with the lower part in water it may be more bulky, sometimes 6 or even 8 inches deep. Wherever placed, the lining seems to be always dry and warm and is made of finer shreds of grass and rush-leaves than is the rest of the nest.

The usual breeding season is May and June, a few birds breeding in July also while, as above recorded, Hume took three fresh eggs on August 16th. Probably these were a second laying by a bird whose first had been destroyed by accident as, normally, this Rail is not double-brooded.

The eggs number five to eight. Occasionally four eggs are incubated, as Betham found four hard-set, and equally rarely nine eggs

are laid, Livesey having taken this number on one of the Kashmir lakes.

In shape the eggs vary from a short broad oval to a long narrow one, the small end pronounced, but very seldom pointed. The texture is fine, close and hard, the surface smooth, generally with a faint gloss, sometimes with a strongly developed one.

The ground-colour may be pale yellow-brown, olive-brown, olive, yellow-grey or pure pale brown. The markings consist of tiny freckles and small blotches of various shades of reddish-brown. In some eggs these markings are so minute and so dense that the eggs look uniform olive, olive-brown or brown. In others the blotches are larger and more scanty, so that the eggs appear definitely though faintly blotched, while in a few eggs only there may be a small cap at the extreme large end.

One hundred and forty eggs average 28.1×20.0 mm.: maxima 30.2×21.1 and 29.1×21.8 mm.; minima 26.0×20.0 and 26.1×19.1 mm.

The male performs a small part of the incubation and probably assists in making the nest, though there is no evidence on the point. The hen sits very closely and, as she generally flies direct from the nest when the intruder is almost on it, is not hard to find.

Rallina euryzonoides Lafresnaye.

THE BANDED CRAKE.

(2014) *Rallina euryzonoides nigrolineata* * Gray.

THE INDIAN BANDED CRAKE.

Rallina supercilialis supercilialis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 16.
Rallus nigrolineata Gray, Cat. B. of Nepal, p. 143, 1848.

This Crake, or Rail, occurs in suitable localities from the base of the Himalayas to, and including, Ceylon. It also has been found in Southern Burma, the Malay States and Annam.

Whether these birds are resident or migratory is not yet solved. Many observers say that they are without doubt migratory, coming in considerable numbers to certain districts to breed, after which they vanish entirely.

Bell, one of the finest observers in the field India has ever had, writes about these birds in Kanara :—" I have never seen one during the dry months, though I am constantly in their breeding haunts

* *Rallus supercilialis* Gray is preoccupied by *Rallus supercilialis* Vieill. (Nouv. Dict. Hist. Nat. xxviii, p. 565, 1819). The next oldest and, therefore, specific name, is *euryzonoides* Lafresnaye (Review Zool. p. 368, 1845), and the subspecific name for our Indian bird is *nigrolineata* Gray (ref. vide supra).

during that time. Whether they migrate or not from the district we do not know for certain, but it seems probable; it would be interesting to know where they go" (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 394, 1902).

The first record of this bird's nesting was one by Betham (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 180, 1902), who had two nests, one with seven and one with eight eggs, brought to him by his shikari, who shot the bird on the second nest with a bow and arrow. The eggs were white and Betham and I doubted their authenticity, which was later proved. After this T. R. Bell (*ibid*, p. 393) recorded in full the nesting habits of this bird. He says that on the 8th August, 1898, "A 'kunbi,' or aborigine of the place, brought H(ervey) the news that there was a nest with large white eggs in a bush in a place called Binghy. We both went out and were much exercised in our minds at the sight of the nest—a more or less round, untidy structure of dead leaves and a thin twig or two, with a slight concavity in the centre, placed in a low bush in scrub-jungle on flat ground, surrounded by hills on three sides, within a mile of the sands of the sea-shore. The nest was well hidden by the foliage of the bush and was placed on the thin interlaced branches about two and a half feet from the ground; there were six white eggs in it of a slightly creamy shade. We sat down to wait for the bird. We had not waited long before we were rewarded by the sight of a Banded Crake that came sneaking out with much circumspection from some thick jungle close by. It disappeared in a second and we shot it the second time it appeared. It was a female in full male plumage."

Later he adds: "We found that the Banded Crake was a fairly common bird in the jungles along the coast during the monsoon and we obtained altogether some dozen nests containing eggs varying in number from four to seven in the clutch, besides finding many empty ones. The nests are placed in bamboo clumps, on creeper masses, on the tops of a stump etc., and were at the most six feet from the ground. The birds breed in the densest jungles as well as in the scrub jungle from sea-level up to the top of the highest hills, which are here about 1,800 feet."

In 1902 Betham (*op. cit.* p. 824) had further eggs brought to him with the bird and examined one nest which "was about 3 feet from the ground, in a dense tangle by the side of a mountain stream, and was built on interlaced stems. The nest was a rough structure of twigs lined with damp leaves."

In 1916 B. B. Osmaston succeeded in getting more nests near Dehra Dun, of which he writes (*op. cit.* vol. xxiv, p. 824, 1917): "On July 10, while exploring a small nulla about a mile from Dehra full of exceedingly dense jungle, I came on a nest of this bird in the middle of a low thick bush. The nest was 4 feet from the ground, composed of dead leaves and a few sticks, with a depression in the centre. The bird was sitting on the nest."

"On my advancing my hand in the direction of the nest, the bird, instead of making off, stood in the nest, puffed out her feathers and pecked viciously at my hand. Having done this she sat down again on the eggs.

"On my second visit on the following day the bird did not wait for me to put out my hand but left the nest, walking along a branch in my direction and opened the attack by pecking me on the hand. She then returned to her nest and settled down again on her eggs."

To summarize these notes, we find that this Crake breeds in dense jungle in ravines on the coastal districts and in the sub-Himalayas, making a nest of grass and leaves, sometimes with a lining of finer material in a well-marked cavity. The nest is placed on bushes etc. at some height from the ground and never on it and, finally, the vicinity of swamp, lake or pond is not a desideratum.

The breeding season is after the rains break, and all the nests recorded have been found between the middle of June and end of August and middle of September.

From four to eight eggs are incubated, the normal clutch being six or seven.

In shape the eggs are broad ovals, the two ends almost equal. The texture is fine, close and hard, the surface slightly glossy but, to the touch, reminds one of the "soapy" feel of Coucal's eggs. It is a texture intermediate between that of some of the smaller Bitterns and that of the Cuckoos mentioned.

Including Bell's large series the average size of ninety eggs is 33.7×26.0 mm. : maxima 35.8×25.4 and 35.1×28.1 mm. ; minima 30.9×25.0 mm.

(2015) *Rallina fasciata* (Raffles).

THE MALAYAN BANDED CRAKE.

Rallina fasciata, Fauna B. I., Birds, 2nd ed. vol. vi, p. 17.

The range of this bird has not yet been well worked out. It was supposed to be found in Burma from Karenni and Rangoon, South through the Malay States to Sumatra, Borneo, Java, the Moluccas and Celebes. I, however, obtained it several times in the North Cachar Hills, and it will probably be found from Assam and the whole of Northern Burma to the Shan States and, quite possibly, to the Bengal Duars on the West.

Wickham was the first person to take the nest of this race. He observes (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 228, 1906):—"On the 29th June I found a nest of the Malayan Banded Crake at Pokokku, Lower Chindwin, containing 5 eggs. The nest was a pad of dead bamboo leaves with a few dry twigs placed on the ground under the thin cover of a small bush. I was lucky enough to get the old male caught on the nest at night with a cast net. The

locality is roughly longitude $21^{\circ} 35'$ North and the nest was in a small patch of bamboo tree jungle, rather dark, not very thick undergrowth, in the bend of a stream which dries up in the hot weather, leaving, perhaps, a pool or two, but was at this time a flowing stream. The nest was within 15' of the edge of the water and was probably just above high flood level. The surrounding country is hilly and the place is a small valley at the junction of these streams, where a few Burmans have squatted and cultivate a few acres of paddy land when possible; the particular patch of jungle was bordering the paddy fields."

In 1913 these Rails seem to have been quite common round Taiping and Simpang, and W. A. T. Kellow took several sets of eggs of which he sent me three with a skin of a female caught on one of the nests. "In each case the nest was made of rushes, grass and leaves placed on or under bushes in very thick undergrowth in forest and a long way from any water."

The only other nest I know of is one taken by Hopwood at Henzada in Lower Burma, about which he wrote me:—"This week (15th August) we found a great rarity. My man found four white eggs laid in a nest of grass and leaves in some very dense undergrowth in the forest. He reported to me and I went out and saw a bird sneak off but could not get a shot and, though she returned, she always sneaked off in the thick growth and foiled me. At last we got a fishing net which one of my men succeeded in casting over the nest and catching her. This was far from water."

Twelve eggs, all I know of except Wickham's, average 31.1×23.6 mm.: maxima 35.0×25.4 mm.; minima 27.2×21.9 mm.; while Wickham gives the average of his five eggs as 29.9×23.9 mm.

They cannot, of course, be separated from those of *R. c. nigro-lineata*—pure white and of the same shape and texture.

All the eggs taken—5, 4, 4, 2 and 2—were fresh, and full clutches may number more.

(2016) *Rallina canningi* (Tytler).

THE ANDAMAN BANDED RAIL.

Rallina canningi, Fauna B. I., Birds, 2nd ed. vol. vi, p. 18.

This fine large Rail is found only in the Andamans.

Hume in his 'Nests and Eggs' describes eggs sent to him as like ordinary Crakes' eggs. Since then Osmaston, Wickham and Anderson have all taken nests and eggs and we know now that the latter are white, like all other *Rallina* eggs.

Osmaston, who sent me a fine series of these eggs, describes the nests in his notes as being always on the ground in thick undergrowth of very high forest; sometimes the nest is near a stream or a cutting full of water but, at other times, well away from water. The nest itself is more primitive than that of the other *Rallinae* whose eggs

are known, consisting merely of a collection of a little grass and a few leaves, collected at the foot of some big tree or underneath the tangled undergrowth.

In one case only has the nest been found above the ground, Anderson recording one found in a thick bush about 3 feet up.

The bird is extraordinarily common in the Andamans and Osmaston caught eighty specimens in a year within a space of about a square mile by nooses set round forest where he knew they were to be found. The birds, however, are so shy and such profound skulkers that Hume believed them to be very rare.

The eggs sent me by Osmaston were taken between the 24th June and the 21st August, while the clutches varied from three to five in number.

The eggs are large replicas of those of *nigrolineata* and *fasciata* but are rather purer white and still more glossy.

Thirty-two eggs average 40.6×30.8 mm. : maxima 43.1×30.8 and 41.3×32.0 mm. ; minima 37.2×30.0 and 39.4×29.7 mm.

Although they only leave their nests at the last moment when disturbed, they slink quietly away without protest. When caught and caged Osmaston says they become reconciled to their surroundings immediately and then show no shyness.

Amauornis fuscus.

THE RUDDY CRAKE.

(2017) **Amauornis fuscus fuscus** (Linn.).

THE PHILIPPINE RUDDY CRAKE.

Amauornis fuscus fuscus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 20.

Within our limits this little Rail is only found in Southern Tenasserim. From this province and from Southern Siam it ranges through the Malay States, Sumatra, Borneo etc. to the Philippines and Celebes.

This bird has not yet been found breeding within our limits except for a single nest with a clutch of four eggs taken in Mergui on 11th August, 1916. Herbert has, however, taken them in Siam and Houwing in Java.

The breeding habits and nidification, so far as is known, are so exactly like those of the well-known Northern Ruddy Crake that it is not necessary here to enlarge upon them.

Houwing says that in Java it breeds in May, in Siam Herbert took six eggs in July, while Mackenzie took four eggs in Mergui on the 11th August.

These fifteen eggs average 28.9×22.6 mm. : maxima 30.3×22.2 and 28.5×24.0 mm. ; minima 28.2×23.0 and 28.4×22.0 mm.

(2018) *Amaurornis fuscus zeylonicus* Stuart Baker.

THE CEYLON RUDDY CRAKE.

Amaurornis fuscus zeylonicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 20.

This small race of Ruddy Crane is found in Ceylon and up the West coast of India as far North as Kanara and Belgaum.

In Ceylon Phillips has taken the nest of this Crane in rice-fields, made, in the usual way, of grass and rush-blades, often in such cases mixed with leaves and stalks of rice or of rice-straw, tucked away among the roots of the growing rice.

Stewart only once took the nest in Travancore but Davidson obtained many nests in Kanara, which, however, he put down at first, and described as, the eggs of *Hypotaenidia*. It was not until he had sent me some clutches that the mistake was found out. He told me that he had made many attempts to get a bird off the nest without success, as they slipped off before he could see what they were, making their way, apparently on foot, through the rice. The nests found by him were all made of grass and old rice-stalks and placed in among the long green grass growing on the banks dividing the rice-fields. It is curious that the nests of this race have only been found in rice-fields, and they will surely, sooner or later, be found in swamps in among reeds and weeds.

The breeding season, both in India and Ceylon, is from the middle of June to the end of September, though Davidson took one nest on 14th May.

The eggs, which number four to seven, are only separable from the Northern bird in being a trifle smaller.

Thirty-four eggs average 30.0×22.3 mm.: maxima 32.0×23.0 and 30.4×23.2 mm.; minima 27.8×22.3 and 28.4×21.5 mm.

(2019) *Amaurornis fuscus bakeri* (Hartert).

THE NORTHERN RUDDY CRAKE.

Amaurornis fuscus bakeri, Fauna B. I., Birds, 2nd ed. vol. vi, p. 21.

The present subspecies of Ruddy Crane has a very wide range, being found from the lower Himalayas in India to Bombay, where it meets and merges into the preceding race. East it is found throughout Bengal, Assam and Northern Burma. In the Kachin Hills the bird is somewhat intermediate, approaching the Chinese race, which is the one inhabiting the Shan States. It breeds over the whole of this area, but many birds move about locally and the majority of the mountain birds move South in Winter, though some stay all the year round in Kashmir. In Eastern Bengal it literally swarms in the Sundabands during Winter but its nest has not often been taken though, doubtless, it breeds in great numbers. Hume, in fact, says that in Bengal it breeds abundantly from July to September. I found one nest in Nadia, others in the great swamps of the Eastern Bengal Districts of Dacca and Mymensingh, and any

number in Assam. West it becomes more and more rare and is absent from the driest areas in the Punjab, Rajputana and Sind. In Kashmir it is exceedingly common in all the swamps up to 7,000 feet and in Assam it occurs, wherever there are possible breeding grounds, up to 6,000 feet.

It keeps almost entirely to swamps, large lakes and marshes and sometimes small ponds and patches of swampy land. I have taken nests occasionally from rice-land but only when it adjoins swamps and marshes. In these cases they are generally placed in the rank grass and weed that cover the banks dividing the rice-fields. On a few other occasions I have seen nests in the miscellaneous growth round ponds and in patches of swampy grass close to them. The vast majority of nests, however, are built on the outskirts, or on islands, of large lakes and marshes, either in the reed-beds which skirt their shores, in the dense grass which grows all round them or in among the water-weeds, lilies etc. which cover their surface. In Kashmir their favourite breeding grounds are the great reed-beds round the edges of the lakes though, even here, most nests have been taken by Osmaston, Livesey and others in the meadow-land adjacent to them rather than actually in among the reeds themselves. In fact Bates (Journ. Bomb. Nat. Hist. Soc. vol. xxx, p. 609, 1925) remarks:—"The Ruddy Crake does not seem to like the large reed-covered jhils, but shows a great preference for the rice-fields and the ditches which supply them. The nests are to be found on the banks which divide the fields, in tangled undergrowth in their vicinity and also attached to the rice-stalks or reeds, a number of which are bent over the nest to form a partial roof, giving to the nest a most pleasing appearance."

The nest is a pad or shallow cup of grasses and weeds, sometimes quite substantial and well put together, at other times rather small and loosely made. The upper part, or the inside of the egg-cavity, is always dry and warm but the base is frequently wet.

The breeding season is quite well defined and the birds do not commence breeding until after the start of the rains. A few birds lay at the end of June but most in early July and thence onwards through August and into early September. Occasionally a nest may be found with a full clutch of eggs in May in Kashmir while, in Assam, if the rains are early, or the spring rains heavy, a good many birds breed in the last week of that month and early June.

The full clutch of eggs varies from four to nine, both exceptional, the most common number being from five to seven.

The ground-colour varies from a very pale cream, almost white, to a cream tinged with pink or reddish, never very deep. The markings are in most cases flecks and tiny spots, or small blotches of reddish-brown with a few secondary ones of lavender and dark grey. As a rule these markings, whether specks or blotches, are scattered over the whole surface and are but little more numerous at one end than the other. In some eggs the markings, both primary and secondary, are larger and bolder and these are nearly always more heavily blotched at the larger end than elsewhere. A very

beautiful clutch of eggs taken by Osmaston in Kashmir gives an impression of a pale pink ground marbled with bright red-brown and clear lavender.

In shape the eggs are broad to rather long ovals, never much pointed. The texture is strong and close with a smooth surface, glossless or only faintly glossed.

One hundred eggs average 32.3×23.7 mm. : maxima 34.2×23.3 and 33.1×24.1 mm. ; minima 29.0×23.1 and 30.1×21.8 mm.

Both sexes incubate, as we have trapped the male on the nest and, as I have seen a male wandering about with material in his bill for the nest, we must give him the credit also of helping to build it. They sit very close but generally manage to creep off before they are spotted. This they do very quietly and seldom seem to fluster off the nest unless the eggs are much incubated.

Amaurornis phœnicurus.

THE WHITE-BREASTED WATER-HEN.

(2021) *Amaurornis phœnicurus phœnicurus* (Pennant).

THE CEYLON WHITE-BREASTED WATER-HEN.

Amaurornis phœnicurus phœnicurus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 23.

The typical form of this Water-Hen is found only in Ceylon and the Southern half of Travancore.

Wait writes of this bird in Ceylon ('Birds of Ceylon,' p. 331, 1925): "Abundant in the neighbourhood of water up to about 2,000 or 3,000 feet. Resident here and there up to much higher elevations."

Except when feeding, and always for breeding purposes, this Rail keeps closely to cover, more especially to heavy bush in the vicinity of water. In nidification and habits generally it does not differ materially from the common form found all over India to China, and these are fully dealt with under that bird.

It is noticeable that a very large proportion of nests are placed above the ground in bushes in scrub-jungle but, otherwise, the sites chosen and the nests themselves call for no remark.

It breeds principally, perhaps, in June and July but Phillips, Wait and Tunnard between them have taken eggs in every month of the year except September.

Like so many Ceylon birds, this race seems to lay very small clutches of eggs. Wait says four to seven but I have had three eggs sent me said to have been incubated, and four or five seems to be a normal clutch. They are quite indistinguishable from the eggs of the other races.

Forty-five eggs average 39.5×30.0 mm. : maxima 42.1×30.3 and 40.5×31.5 mm. ; minima 37.0×28.0 mm.

(2022) *Amauornis phoenicurus chinensis* (Bodd.).

THE CHINESE WHITE-BREASTED WATER-HEN.

Amauornis phoenicurus chinensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 24.

This, the best known of all the races of *phoenicurus*, is found over almost the whole of India except the Southern half of Travancore, all Burma and China South to the islands of Hainan and Formosa and again to Malacca.

Where there is ample water and a heavy rainfall there the White-breasted Water-Hen is a resident breeding bird but, where there are not and the country is desert, semi-desert or without great lakes and swamps, it does not occur. In the North-West and Punjab it is a comparatively rare bird; in Rajputana it is even more uncommon but, in the Sind lakes, it is often almost abundant, though rare or absent elsewhere. In Sind, also, as doubtless in the other drier districts, much depends on the rainfall and, when this fails and lakes, swamps etc. shrink up or disappear, the birds make their way to other haunts where their requirements are to be found.

The nest varies very much both in character and in position. Sometimes it is placed in among tangles of reeds, coarse grass, canbrakes or any of the other forms of vegetation which grow either in the swamps or immediately round them. In these cases the nest may be just clear of the water or several feet above it, while in appearance it is just a heavy, large edition of the nest of the common Coot or Moorhen, made of grass, reeds, weeds etc. At other times it is built quite high up in bushes, trees or palms and it is then often made of twigs, creepers and such other material as may be handy for the purpose. Oates states that most of the nests he found in South Burma were high up in trees, not below 10 feet from the ground. In Assam most of the nests we found were in swamp-growth and were resting on reeds etc. only just clear of the water, sometimes actually in it, but one we discovered high up in a Peepul-tree, while another pair of birds had laid in the deserted nest of a Fishing-Eagle fully 25 feet from the ground.

In Sumbulpore Blewitt found one nest, with five eggs, five feet from the ground, well made and situated in a thick bush; in Bombay Aitken took four eggs from a nest, which looked as if it had belonged to a Crow, built in the crown of a Date-palm.

Theobald in Monghyr and Scrope Doig in Sind found the nests in more normal positions, the latter describing them as "made of coarse sedge, generally in some thorny bush in the water which had grass growing up through it."

In Sitapore Cock says that it is common; "the bamboo clumps on the outskirts of every village would always yield one or two nests in July or August. The nests are usually placed high up in the clumps and are difficult to get at except by a ladder." Oates says that in Burma also "A bamboo-bush, the branches of which are well entangled, is also much affected" as a site for the nest. Every-

where the birds breed after the rains break, i. e., from the end of June until the middle of October, the majority of birds laying in July and August. In Assam over most of the plains, especially in Cachar and Sylhet, where the birds swarmed, we took few nests with full clutches until the end of July but, in North Lakhimpur, we found that many birds laid in May in some of the sub-Himalayan swamps, which were always well filled with water.

The number of eggs found in a clutch is normally five to seven but often four eggs are incubated and exceptionally eight eggs are laid. Bingham found this number in a nest in Tenasserim and clutches of the same number have been seen in Assam, Bengal and Bihar.

In shape the eggs are rather long ovals, blunt at the smaller end and sometimes almost cylindrical. The texture is moderately fine, not very close, while the surface, though fairly smooth, has little or no gloss, though an exceptional clutch has this more pronounced. The ground-colour varies from a pale cream or yellowish-stone to a rather warm salmon-buff, never very deep. In one Chinese clutch taken by Staff-Surgeon Jones in Sham Shui the ground is a warm reddish-buff, but this colour is exceptional. The primary markings consist of irregular blotches and spots, often rather longitudinal in character, of brick-red or rather light reddish-brown, with fewer secondary blotches of grey. In most eggs the markings are fairly numerous everywhere and only slightly more so at the larger end but, in some, the blotches are larger and decidedly more numerous at the larger end, sometimes coalescing to form an indefinite cap. Sometimes the blotches are sparser and sometimes they are all more in the nature of specks and spots, but weakly marked eggs are few in number.

One hundred eggs average 40.5×29.7 mm. : maxima 45.0×31.0 and 41.1×31.9 mm. ; minima 37.0×29.5 and 37.8×28.0 mm.

Both sexes incubate, as I have trapped the male on the eggs, but I have no information as to whether he assists the female with house-building.

The birds sit close and, when nests are made on village ponds—as sometimes happens—they are ridiculously tame and have to be almost pushed off their nests. Otherwise they generally creep quite quietly away just before they can be spotted.

The males are pugnacious but seldom do one another much harm.

The display, or nuptial dance, which I have only once seen, is quite typical of the Rails.

(2023) *Aamurornis phœnicurus insularis* Sharpe.

THE ANDAMAN WHITE-BREASTED WATER-HEN.

Amaurornis phœnicurus insularis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 25.

This race of the Water-Hen is found only in the Andamans and does not, apparently, occur in the Nicobars.

The only account of its nidification is that given by Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 489, 1906), who says :—"It frequents thick jungle far from water, as well as brushwood near streams and swamps. I found many nests in June and July, containing as a rule 4 eggs in each." Later Osmaston sent me a magnificent series of the eggs, together with some additional notes. In most cases the nests were found hidden in the grass and rushes in the swamps, raised just above the water but, in others, they were built some 3 feet from the ground in thick bushes at the edge of the swamp. All the eggs sent to me were taken in June and July, while the clutches numbered anything from three to six. Four was, perhaps, the usual number, but there were also several sets of five and six. They cannot be distinguished from the eggs of the other races.

Fifty eggs average 40.8×31.0 mm. : maxima 43.0×32.0 and 40.8×32.2 mm. ; minima 37.2×31.0 and 35.9×29.0 mm.

The eggs, as shown by the above figures, average broader than those of the common Indian bird, though this difference is not visibly conspicuous.

Amaurornis akool.

THE BROWN CRAKE.

(2024) **Amaurornis akool akool** (Sykes).

THE DECCAN BROWN CRAKE.

Amaurornis akool akool, Fauna B. I., Birds, 2nd ed. vol. vi, p. 25.

This handsome little Crake occurs from Kashmir in the West to Kamroop in West Assam in the East. South it ranges as far as Mysore, Rajputana, the South Deccan and Central Provinces, while it is also fairly common in Bengal and Bihar.

It has been said to occur in the Khasia Hills but I never saw it during the five or six years I was in that district, though *bicolor* was common. Once only I saw it in Barpeta North of the Brahmaputra in the Kamroop District, and there is also a specimen thence in the British Museum Collection. This is the farthest East satisfactorily recorded.

Blewitt gives a good description of this Crake's habits and breeding (Hume's 'Nests and Eggs,' vol. iii, p. 397) :—"Its favourite resorts are swamps, the reeds and bushes on the edges of streams and in the tangled amphibious coverts on the borders of water-courses. A favourite place of abode too is the marshy ground occupied by kewrah plants, the branches and broad leaves of which, it ascends, like *Erythra phoenicura*, with wonderful agility.

"It begins to pair in April and lays from May to August. A nest I obtained at Jhansie was placed just above a bank of a small nullah, on a low-growing wild carounda bush. It was simply a collection of thin twigs and grass, put together just like the nest of a Dove, only in size a little larger. The nest was placed about the centre of the bush, about six feet from the ground, between and upheld by numerous slender branches." Of other nests taken at Saugar in June he writes :—"They were one and all rough constructions, exclusively made of the surrounding grass and rushes on the high ground of the islets, piled up loosely to the height of about six inches with a slight depression in the centre for the eggs."

Lindsey Smith found it common near Mhow, in the Central Provinces. Here the birds made nests very much the same as the types described by Blewitt but better made. Lindsey Smith describes one nest as "a rather compact platform of grass and rush-blades on a good foundation of sticks. The hollow for the eggs deep and well lined with soft grass. Built on a bush standing in a swamp, some of the living grass, growing with the bush, made into an archway over the nest." Other nests were said to be much the same in construction but built on "clusters of reeds and bulrushes by the edge of the swamp and raised a few inches above the mud and water or in among weeds and other cover some yards away from the edge of the swamp."

To Blewitt's and Lindsey Smith's accounts little need be added, but it should be noted many birds nest in deep cover at a considerable distance from any water. In Poona Betham took nests in damp fields concealed in hunches of reeds on, or practically on, the ground.

The breeding season is a long one and some birds may have two broods. Around Poona Betham took eggs in March and in October; Blewitt took eggs in May, June and July; Butler took numerous nests around Deesa between the 22nd August and 28th September, and Gammie had them brought to him from the Sikkim Terai in the latter month.

The number of eggs laid seems to be five or six very constantly, sometimes only four.

The eggs are very like richly coloured eggs of the Water-Rail. In shape they are very broad ovals, usually hardly compressed at all at the smaller end; occasionally they are not quite so broad and are more compressed at the smaller end.

The ground-colour varies from a pale clear cream to a rather bright pale salmon-pink. The markings are of two main types. In the one the blotches of deep red-brown, rather purplish-brown or brick-red are large and bold, fairly numerous at the larger end and scanty elsewhere. Secondary markings of grey and lavender are dispersed in the same way. These eggs are often very handsome.

The second type has the markings much paler, quite small, rather longitudinal in character and numerous or very numerous everywhere and only slightly more so at the larger end. Generally

speaking these latter eggs are of the *Amauornis phænicura* type and are rather poorly marked and feeble in comparison with the others.

Fifty eggs average 34.9×26.5 mm.: maxima 38.8×27.2 and 37.7×28.0 mm.; minima 31.8×26.7 and 34.9×25.2 mm.

I can find nothing recorded about incubation or nest-building, but these will probably be the same as in the next bird, *bicolor*.

(2025) *Amauornis bicolor* (Walden).

THE OLIVE-BACKED CRAKE.

Amauornis bicolor, Fauna B. I., Birds, 2nd ed. vol. vi, p. 20.

Elwes's Crake, by which name this bird has been known hitherto, ranges through the lower Himalayas from Nepal and Sikkim to Eastern Assam, both North and South of the Brahmapootra, and thence farther East through the Hill Tracts of Northern Burma to the Shan States and Yunnan.

These birds were very common in the Khasia Hills, where I found them breeding freely. The nests and the sites selected are much the same as those of the preceding bird but they breed certainly up to 6,000 feet and possibly higher throughout their range and, so far at least, have not been known to nest much below 3,000 feet, except in the Lakhimpur district of Assam, where so many birds breed below their usual elevation.

Most of the nests I found personally, or which were found for me, were built on the ground in grass and weeds, forming the undergrowth in patches of jungle and forest, between fields of rice-cultivation, at an elevation of over 5,000 feet. Some nests, however, were placed in trees and bushes and one, on a *Rhododendron* in dense forest, some way from water, was about 20 feet from the ground.

The breeding season lasts from the middle of May to the end of August, and the number of eggs varies from five to seven and, very rarely, eight.

No individual egg could be distinguished from those of the preceding bird but, as a series, they are even more handsome while the feebly-marked type is quite exceptional.

Eighty eggs average 33.9×26.1 mm.: maxima 36.3×25.3 and 35.3×27.0 mm.; minima 31.3×26.1 and 32.3×25.1 mm.

The only other nest taken of this bird was found by Osmaston at Mogaung in Upper Burma on 18th July and contained six eggs; but Livesey reports a Rail of this description as not rare in the Shan States and he has taken eggs which are exactly like those of this species.

Both sexes incubate and we have several times trapped the male on the nest, while I have also seen the male and female both busily carrying material for the nest.

Gallinula chloropus Linn.**THE MOORHEN.****(2026) Gallinula chloropus indicus Blyth.****THE INDIAN MOORHEN.**

Gallinula chloropus indicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 28.

The Indian Moorhen is found throughout India, Burma and Ceylon, and East throughout the Indo-Chinese countries to China. Kloss tells me that it is not found in the Malay States and does not extend South beyond Tenasserim and peninsular Siam.

Like so many of our Water-birds in India, the Moorhen is restricted in its areas almost entirely by the question of water-supply; where swamps, lakes, ponds etc. are ample there will the bird breed abundantly, where they are wanting the bird will also be absent. In the drier areas of scanty rainfall and where the lakes and swamps are liable to dry up the Moorhens time their visits accordingly, and leave for better watered lauds before these fail them.

Thus in Sind after an unusual rainfall it is common in many places where there are lakes or "dhands," which are spill-overs from the canals and irrigation works. On the other hand, after a drought the birds disappear and, even when there is some water, are much more uncommon. They breed at all elevations; in the plains they are common in many places and they swarm in Cachar and Sylhet. In the hills they breed at great elevations; Ludlow found one nest at Gyantse and they are common all the year round in the vicinity of Lhasa, over 12,000 feet elevation. In Kashmir between 5,000 and 7,000 feet they are very common but, apparently, less common above that height.

The nests I found in Cachar and Sylhet are quite typical and agree exactly with those found by Hume in Achulda, Theobald and many others in Kashmir, Butler in Deesa, Parker in Ceylon and Oates and others in Burma.

In the swamps and lakes of the Surrma Valley the site loved best by this Moorhen is some fringe of rather thin, not very high reeds or rushes growing close in to the shore or at the edge of one of the islands. Here, in tufts a little thicker than the rest, a quite neat little saucer-nest of broad flag-leaves and rushes is made, the bottom an inch or two above the water or resting in it, the upper part, wherever it might be, was always dry and warm, though the base might be rotten and wet. The nest measured anything between 8 inches and a foot across and between 3 and 6 inches in depth.

Next most often the nests were found in dense tangles of reeds in huge reed-beds, the nest resting on the broken-down reeds and sometimes consisting of little more than a meagre collection of the broken

bits. Other nests were found in bushes overhanging the edge of these swamps or growing in them, while others again rested on the roots, lower and even upper branches of trees in or near the water. One nest I found was 20 feet from the ground in a Banyan-tree growing by a fisherman's hut on a dry mound in the middle of a vast sheet of shallow water. Rarely I have seen a nest quite in the open resting on the lily-leaves and other water-plants.

Hume says that "in the hills they have two broods, laying first early in May and again in the latter half of July. In the plains I have only found their nests in July, August and September."

So far as my own experience goes I do not think they are normally double-brooded and, even in Assam, wetter and with wider areas of water and heavier rainfall than almost any other plains in India, I do not think they breed twice.

Occasional birds possibly lay in May and have another brood later, but the regular breeding season is from the end of June to the end of September, wherever the birds are found.

The full clutch varies very much, four to fourteen eggs having been found incubated, but six to nine are most often laid.

The eggs are, of course, just like those of the English Moorhen. In ground-colour they range from a very pale yellowish-stone, in rare instances almost white, to a deep stone-buff, reddish-buff or pinkish-buff. The markings consist of small blotches of reddish-brown thinly scattered all over the egg and not much more numerous at the large end than elsewhere. In the great majority of eggs the spots are rather small and dark and in very few are they really large or bold. In a few they are rather more rich in tint and show up fairly well, while I have seen one or two clutches in which one or more of the eggs have tiny specks almost confluent at the larger end, where they form a red-brown cap, and are almost absent elsewhere.

Two hundred eggs of this race of Moorhen average 40.6×29.6 mm.; maxima 45.0×30.0 mm. and 40.0×31.1 mm.; minima 36.0×30.4 and 39.3×27.0 mm.

In Witherby's 'Handbook' one hundred eggs of the English Moorhen are said to average 44.78×31.77 mm., a greater deal larger than the eggs of our Indian bird.

The Cacharies say that incubation takes 21 days while, if the weather is very hot, it may take two days less or, if very cold, two days more.

The cock-bird sits during the night, which has been proved by nearly all our birds trapped on the nest after dark being males and nearly all those caught by day being females. During the day the female sits closely when incubation is far advanced but, in the early stages, generally leaves quickly, sneaking off through the cover very quietly until she reaches water, when she dives and reappears far from the nest.

(2027) *Gallixrex cinerea* (Gmelin).

THE KORA OR WATER-COCK.

Gallixrex cinerea, Fauna B. I., Birds, 2nd ed. voll vi, p. 29.

This very interesting bird has an enormous range. Wherever there are extensive areas of water and a heavy rainfall it will be found all over India and Burma, being most common in Bengal, Assam and the districts on the South-West coast of India. Outside our limits it extends through the Indo-Chinese countries to China and Japan and South to the Malay States and many of the islands.

The favourite breeding haunts of this Water-bird are in the biggest and most tangled reed-beds in the largest of the swamps and lakes. Nor do they nest near the outskirts, as many other birds do, but work right into the interior of the beds, where they place their nest in the deepest of the tangle. Sometimes, of course, the nest may be found in comparatively small and thin patches and I have even seen nests built in the rice-fields, not on the boundary banks where one sometimes finds the Purple Coot breeding, but in among the growing rice in the water.

Whistler found a nest at Ludhiana in the Punjab, where it is rare, in a reed-bed in a borrow-pit beside the Grand Trunk Road.

So far as I remember I have seen only one nest in the position described by Hume, who writes :—" In Lower Bengal I have seen the nests in swamps and rice-fields, making sometimes a large Coot-like nest of flags and rice-straw in the midst of a dense, tangled mass of reeds, rush and water-weeds, and sometimes a comparatively slight one of fine rush and grass on the floating leaves of lotus and *singhara* (*Trapa bispinosa*). " (The italics are mine.)

The nest varies greatly, as Hume suggests. I have seen nests twice the size of that of any Coot, but of the same character, made of sedges, rush-leaves, grass etc., about 18 inches across and fully a foot deep, though most are under 15 inches in diameter and 6 in depth. The internal cup is generally well marked, the cups having the sides raised against the surrounding reeds. The very deep nests often have the lower few inches in the water, due probably to the water having risen after they had been begun, in which case the birds seem to add to their homes rather than desert them. In great contrast to these big nests is the thin, flimsy nest, about 8 inches across and only 2 or 3 deep, built in places where the water is well away from the nest and the site dry. In rice-fields the nests are made nearly entirely of the previous season's rice-straw and are usually intermediate in size.

The breeding season everywhere, except in Ceylon, is after the rains break in June and continues up to the end of September. In Ceylon I received eggs from Jenkins in January and February and again in July and August, when nests have also been taken by Wait, Phillips and others.



NEST AND EGGS OF THE KORA OR WATER-COCK.
(Inlé Lake, Toungdo, Burma, 3. 7. 33.)



NEST AND EGGS OF THE BRONZE-WINGED JACANA.
(Inlé Lake, July 1933.)

Large clutches of eggs are rare. Hume never took more than five, though the boatman told him they laid as many as ten. In Assam three to six were normal but I have seen eight and heard of nine, though all the Sylhetees consider five a full clutch. In Burma Oates, Mackenzie, Livesey and others have found three to six, while in Ceylon six is the largest clutch found and, more often, three to five.

In appearance the eggs are rather like well-coloured Coots' eggs but the variation is much greater. The ground varies from almost pure white, which is rare, through pale pink, yellow or stone-colour to deep brick-pink. The markings consist of reddish-brown blotches and spots rather longitudinal in character, with secondary ones of neutral tint and purplish-grey, rather less numerous than the darker markings. In the great majority of eggs the markings are fairly profuse over the whole surface but slightly more so at the larger end. In a few instances the markings are so numerous as to almost cover the ground-colour, while in a few others they are dense at the larger end and sparser elsewhere. In depth of colour also the blotches vary a good deal and the contrast between the darkest and lightest eggs is very strong.

The shell is stout and the texture rather coarse but close, while the surface is fairly smooth and sometimes, especially in freshly taken eggs, with a slight gloss. In shape they are rather long ovals, the smaller end distinctly compressed.

One hundred eggs average 42.2×31.0 mm. : maxima 46.6×33.0 and 43.2×33.1 mm. : minima 38.9×31.3 and 39.5×28.1 mm.

According to the Sylhetees incubation takes twenty-four days and they are probably correct in their estimate as, when they take the eggs to hatch, so that the young can be trained for fighting purposes, they hatch them themselves by tying them up in a cloth which they wear next their stomachs. A very keen observer among these Water-Cock fighters told me that he thought the males were polygamous, but I rather doubt if this is the case. He does, I believe, no nest-building and no incubation, but spends much of his time in trying to get up scraps with his male neighbours.

I have never seen a courtship display, but it is probably the same as that adopted in the challenge to fight which I have been fortunate enough to witness. In this instance from a dugout we saw a cock with his back to us commence booming. When we caught sight of him he was about three-quarters back on, his head held low down close to the water, his head-, throat- and breast-feathers ruffled. He emitted a low boom and then paused for a few seconds, after which boom succeeded boom in rapid succession and in increasing volume, his neck and breast apparently swelling until the feathers appeared to stand out straight. A second male then began to boom close by and, after a minute or so, there was a rush and the first bird was knocked head over heels into the water. In a second he was up and the two started tooth and nail at one another when,

unfortunately, my boatman dropped his paddle and scared them both away.

The female sits very close and I have seen her, when she thought she had not been noticed, flatten herself on the nest, close her eyes and refuse to move until we almost touched her.

Porphyrio poliocephalus.

THE PURPLE GALLINULE.

(2028) **Porphyrio poliocephalus poliocephalus** (Lath.).

THE INDIAN PURPLE GALLINULE.

Porphyrio poliocephalus poliocephalus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 32.

This grand Coot, or Moorhen, breeds throughout the plains of India, Burma and Ceylon wherever there are swamps and lakes with sufficient water and cover for breeding purposes. In India it does not ascend the hills but it breeds in the Inlé Lake in the Shan States at about 4,000 feet, where Livesey has seen many nests and the bird is common.

The situation for the nest varies considerably; most of those I have found personally have been large structures of reeds and grass mixed with a little water-weed and, curiously enough, very often having the wettest weeds on the top of the nest. The materials are fairly well put together but they are very untidy nests, with odds and ends of rushes etc. sticking out in every direction. The nests are between 10 and 15 inches in diameter, while in depth they may be anything from 4 to 15 inches.

The favourite site for the more bulky nests is in among the tangled masses of reeds which grow in clumps here and there in all the Bengal and Assam swamps. Some of these clumps may be as much as 30 or 40 yards across each way and, when the birds are especially numerous, as in Sylhet and Lakhimpur, I have sometimes seen five or six nests in the same clump, placed not a dozen yards from one another. Where they are less common one pair of birds takes possession of a clump to the exclusion of all other birds. Probably the birds are numerous because food is so plentiful, and so a division into territories is not necessary. Another common site for the nest is on the curious floating islands of weeds that one sees almost everywhere in the lakes of Burma and India. So matted are these weed-beds that they will often bear the weight of a man walking over them so long as he keeps moving. The leaves and flowers of some of these weeds project a few inches above the water and provide sufficient concealment for the Purple Gallinule's nest, which in such positions is only 2 or 3 inches deep and also less wide than usual. In these places it is generally built of weeds and dead—sometimes very evil-smelling—leaves of the water-lilies etc., with

an intervening layer of rush-blades and reeds between the tops and the bottom.

Hume also found "floating" nests though not free. Of these, he says, "the bottom of the cavity will not be more than an inch or two above the surface of the water, but there will be a mass of stuff submerged."

Occasionally a nest may be found placed on one of the banks, between rice-fields, which are always densely covered with vegetation of sorts. One such nest was composed entirely of young rice-stems, pulled up by their roots and matted into a neat little nest barely 6 inches across. Other sites sometimes made use of are the flat tops of dense bushes which grow round the edges of swamps, on dry land in winter, but which are nearly submerged in a sea of water when the rains are advanced.

The breeding season nearly everywhere seems to be July, August and September but, in Assam, I have taken eggs from the 14th June to the 10th October. In Ceylon most birds, according to Parker, breed from February to April, but Phillips took a clutch of six eggs at Torrappane on the 31st May.

In Burma they breed in the same months as in India.

The normal clutch varies from four to six but seven are not unusual, and Jesse took a clutch of nine in a lake near Lucknow.

The eggs vary in ground-colour from a pale pinkish or buff-stone to a fairly warm buff, often flushed with rosy or salmon when quite fresh. The markings consist of fairly bold small blotches and spots of brown, red-brown, purple-brown or nearly black, scattered sparingly over the whole surface but a little more densely at the larger end, where, however, they never form a cap or zone. The secondary markings are fewer and are of lavender-grey or purple-grey. The character of the markings varies very little, though in a few they are smaller and less pronounced. Of unusual clutches two are worth recording. One taken by Vidal in Kanara has the ground a pale greenish- or yellowish-stone, on which the normal markings stand out in very bold relief. Another taken by Primrose in Goalpara has the ground a deep rich buff, while the markings consist of large, smudgy blotches of reddish-brown, some measuring as much as 12 mm. across.

In shape the eggs are long ovals, the texture hard, close and fairly fine, while the surface has a slight gloss when the egg is just laid.

One hundred eggs average 50.5×35.7 mm.: maxima 54.6×36.9 and 52.1×37.2 mm.; minima 45.7×36.1 and 49.3×34.2 mm., I can find no difference in the average size of Southern and Northern eggs but it should be noted that Hartert gives the average of fifty birds, mostly from Ceylon and Southern India, as 48.0×35.3 mm.

The nest takes a very short time to make, as I have examined clumps of reed in the early part of the week which contained no vestige of nest yet, at the end of the week, contained nests with one or two eggs. The cock-bird may help to make the nest in so far as

collecting material goes, as I have seen him walking about with his mouth full of weeds, though, it must be confessed, these were generally dropped before being made use of.

I have frequently seen the courtship of the male. The two birds, male and female, may be seen quietly feeding or swimming together when he suddenly considers it is time to show off. Collecting a few weeds in his bill, he approaches his mate by swimming or running and, when within a foot or two of her, bobs his head energetically up and down several times, repeating a little clucking note all the time. He then draws himself up as high as he can, raises both wings and flaps hard, after which he once more bobs and ducks. Finally he finishes up by bringing both wings up and forward, quivering them all the time and ending with a deep loud cackle. The same procedure takes place whether swimming, walking or climbing in the reeds. In the latter case his excitement is sometimes greater than his caution and he tumbles headlong into the water. In this particular courtship display the hen-bird often takes some interest and will join in the cluckings and bobblings.

There is no proof that the male assists the female in incubation.

Fulica atra.

THE COOT.

(2029) **Fulica atra atra** Linn.

THE COOT.

Fulica atra atra, Fauna B. I., Birds, 2nd ed. vol. vi, p. 34.

The Coot is found and is resident over practically the whole of Europe and Asia except in the Arctic. In India it is found practically all over the plains and has been shot in Ceylon by Mr. Hirst early in 1925. It is probably resident wherever found, except in certain places such as Sind, parts of Rajputana and other very dry areas, while they also breed plentifully in Kashmir and other Himalayan areas up to some 8,000 feet.

To those who know the breeding of the English Coot there is no need to add anything about this bird. It builds the same cup-shaped nest of sedges and rush-leaves in among reeds, preferably in reed-beds of some extent in large lakes, but often in narrow fringes round their edge. They do not, however, confine themselves to the larger lakes and swamps but often breed in quite small tanks.

Betham found them breeding round Poona in considerable numbers and, in response to a query by him as to its breeding elsewhere, Inglis mentioned its breeding at Belahi factory in the Mazufferpore district in quite a small tank, and Howard Campbell noted: "I am under the impression it breeds freely in most parts of the Madras

Presidency ; I found nests in several places in the Cuddapah Districts. In 1892 I found a nest in a small tank near the town of Cuddapah. On the 30th Oct. in the same year I found several nests in a small reedy tank at Oochaveli containing fresh eggs. They evidently have two broods, for I have seen young birds following their parents on a tank in April " (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 393, 1902).

Long before this Burgess had recorded (*vide* Hume) that he had found Coots breeding in the Singwa Tank, North of Ahmednuggur, while Butler took a clutch of seven eggs in a tank near Belgaum on the 28th July.

Normally the nest is a mass of weeds and rushes with a well-made cavity lined with dry rush-blades, placed in among the reeds low down, often resting on some turned-down reeds in a tuft rather thicker than those surrounding it. These nests may average some 8 inches or so in diameter. Often, however, it is a much more bulky affair and I have seen many nests in Cachar similar to those described by Hume :—"The nests are sometimes large conical masses of reed, rush and weed, very strongly built in the midst of rice or rushes in water 6 to 18 inches deep, but based upon the ground and rising several inches above the water-level. One that I measured was 3 feet in diameter at the base, 2 feet high and about 11 inches in diameter at the top, where there was a depression or shallow cup about 8 inches across and 3 inches in depth ; others built in shallower water are proportionately less massive and less broad at the base. Sometimes they are more or less floating, having been built on a platform of lotus-leaves and down-bent over-crossing reeds and rushes."

In Kashmir Theobald says that he found them breeding in May but, even here, I think more lay in June on into July and even August while, over most of the plains, they breed after the rains break in June and from then onwards to the end of September.

In Cachar, Sylhet and Lakhimpur the birds were common, though they nowhere bred in the great numbers the Moorhen did. Here they never laid until the rains were well advanced and the swamps had begun to fill up, which meant that, though an odd nest or so might be taken with eggs in the first week in July, the great majority laid in August. In Madras (*vide supra*) Howard Campbell found that they sometimes had two broods in the year, breeding very early—presumably March and April—and again in July and onwards. Cardew also found a nest with five eggs on the 21st March when out Snipe-shooting.

In England Witherby says that these birds have two or three broods but, in India, two must be the maximum and even that, I believe, is exceptional.

The number of eggs laid is most often five to eight, but clutches of nine and ten are not rare and I have heard of well authenticated clutches up to fourteen.

In shape I should call the eggs typically rather long ovals, distinctly compressed towards the small end and sometimes rather pointed. The texture is fairly close, hard and fine, but the surface glossless.

In colour they vary extraordinarily little. The ground, I think, might perhaps be best described as drab, or as yellowish or brownish-grey. Buff they are not, though this colour is so often used in describing them. The marking consists of tiny freckles and very small blotches of blackish-brown scattered thinly over the whole surface. In a few eggs the markings are a trifle larger and bolder, but I have never seen a really well-marked egg.

One hundred Indian eggs average 53.1×35.6 mm.: maxima 57.0×37.1 and 50.3×37.8 mm.; minima 47.5×35.0 and 50.3×34.3 mm.

The male assists the female both in building the nest and in incubation, which takes twenty to twenty-one days. Coots seem to agree well among themselves and have no breeding territory; two nests may be found within a few yards of one another and sometimes several in the same reed-bed, but they are very intolerant of other birds and frequently drive away those who would otherwise nest among them.

Family HELIORNITHIDÆ.

(FINFOOTS.)

(2030) *Heliopais personata* Gray.

THE MASKED FINFOOT.

Heliopais personata, Fauna J. I., Birds, 2nd ed. vol. vi, p. 36.

This very remarkable bird is found from Eastern Assam and Eastern Bengal, North and East of the Bay of Bengal, Burma and Malay States to Sumatra, while East it occurs in Siam and Cambodia. Nothing was known of the breeding of this bird until Dr. Gregerson and Mr. A. Nuttall found 'a nest with young birds and a single pigmy infertile egg in Digaltarang, Assam, in July 1904. These two gentlemen were engaged in surveying some of the endless swamps which stretch for many miles on end through the forests at the foot of the Himalayas in Assam. Sometimes the waterways run like narrow canals through gigantic trees which meet overhead in a gloomy arch of tree-branches, creepers and parasites; sometimes they widen out into great areas of swamp and lake. As the canoe these two gentlemen were in glided out of the deep forest into one of these open swamps they noticed a Masked Finfoot slide off what looked like some debris in a tangle of low tree and creeper. Following the bird up, they shot her but failed to catch

any of the chicks which they thought they had seen with her; they, however, examined the débris and, to their surprise, found a nest, very like a Crow's, made of sticks and rubbish, lined with grass and reed-bits and containing an egg which was sent to me and was found to be clear. Later, when we had other eggs to compare it with, it was found to be a pigmy.

Nothing more was discovered about this bird's breeding until 1920, when Messrs. Marlow and Smith obtained several nests and gave Hopwood full notes, from which he compiled a most interesting account of the breeding (Journ. Bomb. Nat. Hist. Soc. vol. xxvii. pp. 634-636, 1921), from which the following is an extract:—

"The upper reaches of the Rangoon River are known locally as the Myitmaka River, a sluggish stream flowing through the Plains of the Tharrawaddy district, and in places opening out into big lagoons, the chief of which is the large lake known as the Mindu In. When the Irrawaddy rises, the flood water covers large areas of the low-lying country and backs up the Myitmaka, the result being a huge swamp, in which the depth of water varies from 5 to 15 feet or even more. Much of the inundated area is under forest growth, consisting of trees, shrubs, and a tangled growth of creepers, and, as might be expected, the Pinfoot revels in country of this nature. The birds are by no means uncommon and are well known to the villagers by the name of Ye Ballen, which means the Water-Babbler, due to the bubbling noise made by the birds, similar to that made by blowing bubbles through the water."

Hopwood then quotes Marlow's account of the finding of the first nest:—"On July 20th a hunter sent me word that he had found a nest of Ye Ballen at Mindu and the bird was sitting. The next day I visited the nest at about 5.30 P.M. and saw the bird sitting tight on a nest of twigs about 15 inches in diameter on a horizontal branch of a 'kyt-lin' (*Barringtonia*) about 7 feet above the level of the water, which was here about 5 feet deep. The nest was also supported by creepers which covered the branch. I had approached to within about six feet of the bird, but except that she watched me closely she was not disturbed. At about 6.30 P.M. Mr. Smith and I approached the nest carefully and found the bird still sitting closely and with her head tucked away in the nest. She raised her head to look at us and did not fly away until Mr. Smith was only about three feet from her. We climbed the tree and beheld a glorious sight. In a large boat-shaped nest of twigs, lined with a few dead leaves, were seven spheroidal, glossy, cream-coloured eggs mottled with brown and purple. On the 30th July on the same river we found another nest with seven eggs. The eggs were in a similar nest similarly placed to the first but rather neater, and only about 3 feet above the water.

"Our next find was on the 2nd August. This nest was about nine feet above the water and on the higher branches of a thorny bush, not so much overhung as the first two nests."

Many more nests were found that year during August containing two to five eggs, nests and positions being the same except that one was only a few inches above the water and would undoubtedly have been swamped later on as the river rose.

Hopwood adds :—" A nest sent me is a very thick mass of small sticks, heaped one upon the other to form a large pad ; I should say it must have been nearly a foot in height. Mr. Marlow gives the average dimensions of nests as 15 inches in diameter, outer measurement, while the egg-cavity, a shallow cup, is about 8 inches in diameter ; the nests are roughly circular.

" The nests found so far have all been close to villages, which are not numerous, as may be expected from the nature of the country."

There is little one can add to the above. Messrs. Marlow and Smith continued to find nests and eggs during July and August in the next few years and sent me a wonderful series of the latter. These were all found between early July and late August and it seems evident that the birds do not breed until the rains have already had time to flood the vast area of forest land in which they collect to breed. Probably birds from elsewhere migrate locally to this area from other parts of Burma for the purpose and, possibly, even from Assam, for there seems in that province to be a semi-migration South in April and May, whilst birds have been seen moving North and North-West in October and November.

The number of eggs in a full clutch seems to be five or six and sometimes seven or four only.

They are *sui generis*, yet very Ralline in many respects. In size they are simply huge in proportion to the bird ; in shape they are spheroidal, a few being less so than the others ; in one or two clutches also the eggs are slightly pointed at *both* ends, a most unusual character in eggs of this shape. The texture is fine, finer than in any Ralline eggs known to me, very hard and close and with a very high superficial gloss. In texture and gloss and, indeed, in shape they remind me much of the eggs of some of the Bustards. The ground-colour is a very faint cream, in some eggs faintly tinged with pink, in others, according to Hopwood, equally faintly tinged with green. Of these latter I have seen none and, perhaps, this tint disappears soon after blowing. The primary markings consist of small or fairly large blotches of reddish-brown or blackish-brown, sparsely scattered over the whole surface, generally equally so but, sometimes, more numerous at the larger end. The secondary markings of lavender-grey are similarly distributed and are sometimes more, sometimes less, numerous than the primary.

Forty-four eggs average 52.0×43.7 mm. : maxima 56.1×45.8 and 50.9×46.0 mm. ; minima 50.0×43.7 and 50.7×41.1 mm.

Both sexes incubate but there is no information about the nest-building or length of incubation.

Suborder J A C A N Æ.

(JACANAS.)

Family JACANIDÆ.

(JACANAS.)

(2031) *Metopidius indicus* (Lath.).

THE BRONZE-WINGED JACANA.

Metopidius indicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 40.

The Bronze-winged Jacana is found throughout India and Burma where the rainfall is heavy and there is ample water in the way of lakes, ponds and swamps for breeding purpose.

Hume says it "is very rarely if ever seen in the drier portions of the North-West Provinces, in the Punjab, Rajputana and Sind. In the wetter districts of Oudh, the sub-Himalayan Terrais of Rohilkund and Goruckpoor, through the greater part of Bengal and Burma it is very common, and here, as also in the better watered portion of the Central Provinces and the Peninsula of India generally, it breeds from June to September. It never ascends the hills and never frequents rivers."

As regards the above, it must be noted that Bates found and photographed the nest in Rajputana and that it is very common in the lakes of the Shan Hills up to some 4,000 feet.

It is necessary to quote what Hume says of this bird's nidification and haunts, as so much of it is contrary to my own experiences, yet, being Hume's, must be true, so far as it goes, in connection with his own experience. He says :—"The nest, generally a large one, composed of rushes and water-weeds twisted round and round, so as to form a circular pad from 10 to 20 inches in diameter, with a central depression two or three inches in depth, is commonly placed here, in Bengal, on a bed of lotus-leaves in some secluded rush-covered corner; one nest, however, was on a piece of swampy ground in the midst of a clump of thick rushes, surrounded on all sides by the water of the jheel.

"Of the nests none contained more than seven eggs, but the boatmen averred that the birds, sometimes at any rate, laid ten."

Doubtless the nests are sometimes large and massive affairs, though I have never seen such, but I cannot help feeling very incredulous about the number of eggs. I gave a very full account

of the breeding of this bird in the Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 476, 1929, to which I can add little, so quote *in extenso* :—

"The Bronze-winged Jacana begins to think about domestic arrangements as soon as the rains show signs of commencing. With the advent of the first few showers the birds start collecting materials for their rather insignificant little nests. These materials consist of wet weeds, reeds and stems of water-lilies upon which a flimsy lining of dry rushes and bits of dry leaves are placed. Altogether the nest is so small and weak that it looks as if it could never support the weight of eggs or chicks. This apparent flimsiness is, however, overcome by the nest being built on the top of semi-submerged lotus-leaves or water-lily plants, so that, though the base may be quite soaked through, the lining is usually fairly dry. The site selected for the nest is generally a swamp or marsh of some extent, and the birds very seldom breed in small ponds or tanks, whilst, on the other hand, they sometimes make their nests in the middle of lakes, open except for the surface-weeds and lilies which lie in patches here and there. Occasionally I have found them upon quite small ponds and once, in the district of Rangpur, a pair took up their abode and made their nest in quite a small tank in my garden. Here I noticed the birds only worked at their nest for a couple of hours in the mornings and evenings and, even then, were very casual and slow in their proceedings, often stopping work to feed or loaf for a few minutes. Indeed, the nest looked as if it might easily have been put together in an hour, though as a matter of fact the birds took four days to build it. It was, of course, a very inconspicuous nest, almost level with the water, and almost of the same colour as that of the lotus-leaves on which it was built. Had I not seen the birds building the nest it might easily have escaped my notice. In this nest the bird laid only four eggs, but five are not uncommon and I have once or twice found six."

The great majority of nests are built in water which is open except for floating weeds; a few nests are built in short reed- or rush-beds, but very few like that described by Hume, in dense reeds.

Each bird seems to have a distinct territory and I have never seen two close together. When they breed in small ponds one bird takes the whole pond to itself and, when two nests are in a large pond, they will almost certainly be at opposite ends.

As regards the *large* nest seen by Hume, Blewitt also says of nests found by him, "from a foot to nearly two feet in diameter. In each situation a sheltered spot is chosen, offering concealment; among thick-growing lotus-leaves is a favourite resort." Butler, however, records of one nest: "At first the eggs looked as if they were simply resting upon the surface of the water, but it turned out that they were supported by a considerable quantity of aquatic weeds collected together under the water." I have seen an enormous number of the nests of this bird in many districts. I have, however,

never seen a big one and I have never seen one carefully concealed except by the fact that they agreed so well with their surroundings.

In years when the true rains start early and there has previously been some rain this Jacana commences to breed in June, and I have eggs taken in the first week of that month, but normally eggs are laid in July and August and many in September. This seems to be the rule wherever it breeds in India, while in Burma Oates found eggs in August, Hopwood and Mackenzie in August and September, and Macdonald and Livesey in July and August. Even in Travancore Bourdillon obtained eggs in the latter month, though in this province normal breeding dates do not always obtain. Sometimes they seem to have a very early brood and then a second one in the usual season. Tooth (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 247, 1902) records a pair having their first young ones in April and, after the outbreak of the monsoon, starting again and having three eggs on the 2nd July. The usual full clutch of eggs is undoubtedly four. Blewitt speaks of clutches of eight or ten and Hume (*vide supra*) of seven, but I have never seen more than six, very rarely this, and only very occasionally five. Certainly 95 per cent. of nests have four eggs only, while every now and then one sees a three incubated.

In shape the eggs are rather broad ovals, generally not much compressed at the smaller end, but rarely rather pointed. The texture is very hard, close and fine, the surface having an intense gloss, almost as great as that found in the lovely eggs of the Tinamus. In colour they are exceptionally handsome eggs. The ground varies from a clear yellow-stone or buff to a rather bright rufous or red-brown, while the whole surface is covered by a tangle of long lines, twisted about in every direction, and looking as if a child had been attempting to write all over it. In most eggs these lines are very numerous but in none do they obliterate the surface. In a few eggs they are rather less plentiful and stand up very boldly and strikingly on the ground-colour.

One hundred and twenty eggs average 36.4×25.1 mm. : maxima 39.5×27.0 and 36.0×27.3 mm. ; minima 33.8×24.9 and 35.4×22.0 mm.

Both sexes incubate and probably both help in making the nest, as I have seen the male wandering about the tank with material in his mouth though, as a rule, he forgot what he wanted it for and dropped it. At the nest in the tank in my compound both birds did about equal work—that is to say as little as possible—and yet had it completed in time for the eggs.

Incubation, I think, takes fourteen or sixteen days.

I have seen but little display, and imagine what I have seen is not the whole business. The male I watched in the early mornings and late evenings would sometimes run backwards and forwards very excitedly in front of the female carrying weeds in his mouth,

sometimes he would pause and make a few rapid hobs and then drop the weeds and return to his feeding. Occasionally the female would respond with two or three rapid little runs and bows, and then she too would go on with the more important business of catching insects.

(2032) *Hydrophasianus chirurgus* (Scop.).

THE PHEASANT-TAILED JACANA.

Hydrophasianus chirurgus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 42.

This, perhaps the most beautiful of all our Indian Water-birds, has an even wider range than the preceding bird. It is found in similar places to that species all over India, Burma and Ceylon, and has been recorded as far North as Gilgit and Panji, while it is common in all suitable country in Kashmir and the Outer Himalayas, and I have had it brought to me from the Abor Hills. Outside our limits it ranges to South China, the Philippines, Java and Borneo.

This Jacana breeds in the same situations and in the same kind of lake, swamp and marsh as the Bronze-winged Jacana, while it makes nests which cannot be distinguished from those of that bird. On the whole the nest is even more flimsy and more casually made, but it is also more constantly built on a substratum of broad lotus-leaves. One nest I saw was indeed a lotus-leaf with upturned rims, nothing being added beyond about twenty or thirty chips and bits of dry rush, while Bates in Kashmir (Journ. Bomh. Nat. Hist. Soc. vol. xxx, p. 605, 1925) found eggs laid "on a thick layer of soggy weed" with no attempt at a nest. It breeds in smaller tanks and even wide ditches more often than the Bronze-winged bird, while on the larger lakes two nests may be found close together and they seem to have no desire for a special territory. The nests are never hidden in any way, though at the same time they are very inconspicuous. In the Khasia Hills I found them breeding in tiny pools of open water in rice-fields at over 5,000 feet, and here the nests were usually made of blades of green rice and bits of the old straw.

They breed at the same time of year as the Bronze-winged species but perhaps a little earlier, many birds laying in June.

Blewitt found them breeding at Sangur in August; Marshall at Bolundashahr and Cawnpore in July; Butler in Deesa took eggs in August and September, and Wenden in Callian between the 20th August and 29th October. In Assam Inglis, Coltart, Primrose and I found very many nests from early June to the end of October with fresh eggs, and in Bihar the two first-named record the birds breeding in the same months. Scrope Doig found numerous nests in the Eastern Narra, Sind, in August. In Burma many collectors have taken the eggs in these months, and it is only in Ceylon where the breeding season changes and is said by Legge to be April and

May and by Wait to be March to June. Wait also adds that they sometimes lay their eggs on hare floating lotus-leaves.

The eggs almost invariably number four, never more and only very rarely three.

In shape they are peg-top, often very flat at the top of the larger end. The texture is fine but less close and hard than in *Metopidius* and the eggs are much more fragile; the surface is smooth and generally with a fine gloss.

In colour they are immaculate bronze, varying considerably in tint and depth from a rufous-brown bronze to a deep almost chocolate-bronze. Other eggs have a definite olive tint and some might be described as a yellow-brown. Abnormal eggs are not rare, and I have clutches of pale yellow-brown and eggs of pale grey-blue, sometimes only one in a clutch, sometimes more. One curious clutch of three has two eggs pale grey-green with specks of blackish at the larger end; the third egg looks like a piece of mottled green moss, the whole surface being heavily mottled with brown-green.

A hundred eggs average 37.4×27.6 mm.; maxima 39.9×27.1 and 36.1×29.0 mm.; minima 34.5×28.9 and 34.6×26.0 mm.

Both sexes make the nest but the female alone incubates. She sits very closely, though during the warm hours of the day the eggs are often left exposed for hours on end. Rain at once drives her back, and I have seen her sitting close in the heaviest tropical rainfall, getting up every now and then to shake herself free of the raindrops.

Family ROSTRATULIDÆ.

(PAINTED SNIPES.)

Rostratula benghalensis.

THE INDIAN PAINTED SNIPES.

(2033) *Rostratula benghalensis benghalensis* (Linn.).

THE INDIAN PAINTED SNIPES.

Rostratula benghalensis benghalensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 45.

The Painted Snipe is resident over the whole of the immense area it occupies, though it may move down from some of the Himalayan haunts in Winter. Roughly its habitat is Africa, South of the Sahara, through Egypt to Southern Asia. It is found in Madagascar; rare, if it occurs at all, in Arabia and Persia; common all over India, Ceylon and Burma, whence it extends over the Malay Peninsula to the Philippines, through Central China and Formosa to

Japan. In Kashmir it is found at all elevations (where there are suitable lakes and swamps, but it is said to leave the country in Winter. In the Khasia Hills it breeds at 5,000 feet or more and many birds stay all the Winter, though some certainly leave during December and January. In the Nilgiris and Travancore they appear to be resident up to 3,000 feet all the year round.

Almost any site near water suffices for the needs of a Painted Snipe for its nest. The water may be an isolated pool with a few sedges and a sheltering bush or two or it may be some equally tiny islet just above flood-level and situated in the middle of a vast sea of water and jungle, stretching for miles on every side. I have taken them from dense masses of cane-brake and jungle growing on the borders of the swamps which stretch all along the foot-hills of the Himalayas in lonely wildness far from any sign of civilization, and I have taken one from a ditch in the station of Silchar, about 30 yards from the nearest house.

Butler writes ('Stray Feathers,' vol. iv, p. 223):—"The nests, all of which were in the vicinity of rice-fields, were in most instances on the ground; but in one or two cases they were raised as high as 8 or 10 inches from the ground, and supported by the grass in which they were built.

"Of the various situations they were found in, one of the most common was the raised footpaths which so often intersect these fields. In the rains the sides of the footpaths become overgrown with grass, and in this grass the nest is often built. Another favourite place is the short, green, rushy grass that grows by the side of tanks and in swampy ground—this perhaps is the most favourite place of all; and in many of the nests found in this situation the blades of grass were drawn together over the top of the nest, so as to form a sort of canopy as in some nests of *Porzana akool*. Another favourite spot is a rice-field which has been ploughed up and left unplanted for some time until the grass begins to grow over it."

In Jellalpur, Sylhet, Mr. H. A. Hole and I found that the birds did not wait even for the grass to grow, and we took nests with eggs in ground so recently ploughed that there was no growth at all, the nest being placed merely under the protection of a clod bigger than those surrounding it. More nests were found in the dense weed and grass vegetation in the ditches round the fields, but some nests we saw were 30 yards or more away from the ditches.

The nest itself is a fairly compact pad of grass, straw, rushes or weeds, measuring about 6 inches across and from 1 to 3 in depth. When placed in a hollow deeper than usual the nest may be almost cup-shaped but, as a rule, it is just a flat pad with a depression in the centre for the eggs, about an inch deep. Those I have found have nearly always been placed on the ground but, sometimes, when in extra thick tufts of grass, it may be raised a few inches above it. Occasionally a nest may be built on a tangle of cane, reeds or creeper a few inches above the water-level.

In the Shan States Livesey found these birds common on the Inlé Lake, where they were making their nests on the floating weeds and bog, so that when the water rose the nests rose with it. It is nearly always placed in a wet or damp position but, like those in the ploughed field, this is not invariably so. Again, it is generally well concealed, but at other times is placed quite in the open and would be conspicuous did it not blend so well with its surroundings.

The Painted Snipe breed more or less throughout the year, though three out of four nests will be found in India and Burma during the months of July, August and September. The controlling factor is water-supply and the attendant increase in food and, accordingly, in some districts where there is drought there will be a cessation of breeding in the driest months. In Ceylon also the birds lay all the year round, and Legge records eggs from every month except January, February, August and October; as, however, he got oviduct eggs in November and December and young birds and an oviduct egg in March, his records cover practically the whole year. Coussmaker notes that it bred South of Mysore in December, and Scrope Doig obtained eggs from May to July in Sind, while Whitehead took a nest with two eggs in the Khagan Valley in October.

The normal full clutch of eggs is four, only very occasionally five or three.

In shape the eggs are pointed ovals or moderately pyriform. The texture is hard and close but not very fine, though the shell is strong and, for Waders' eggs, they are small, being less in cubic content than a Jack Snipe's egg, though the bird is so much bigger.

They are exceptionally handsome eggs. The ground-colour is always yellowish, varying from a pale yellowish-grey to a deep rich buff. The colour is always bright when fresh but varies greatly in tint. Yellow is always the dominant colour, but it may be faintly tinged with grey, green, olive or even pink. The markings are black, sometimes edged in the larger ones with sienna, and are very bold and conspicuous and, though freely distributed over the whole surface, not numerous enough to efface the ground-colour. In character the markings vary greatly, ranging from fine twisted lines and hieroglyphics to large bold blotches. The secondary markings, few in colour, are pale grey-brown or sienna-brown. In a few eggs the black markings are replaced by brown or even sienna-brown blotches and lines. In most eggs the markings are rather more numerous at the larger end, but seldom form a cap or ring. In most eggs the blotches alone constitute the markings and in very few are lines only to be found, while in many eggs the two are combined.

An exceptionally handsome clutch of eggs taken by Harington in Burma has the marking almost confined to a deep band of black running round the egg and covering more than half the surface.

One hundred eggs average 35.9×25.5 mm.: maxima 40.1×26.2 mm.; minima 32.0×22.3 mm.

The female is polyandrous, pugnacious, an unpleasant wife and a mother who entirely neglects all her duties.

She fights vigorously for the possession of her husband, calling him and at the same time challenging other females by a loud note, sounding as if someone was blowing sharply into a bottle. The display of the female is very fine. "She crouches close to the ground and then spreads wings and tail like a fan above her back, hissing loudly as she does so. As Finn shows ('How to Know the Indian Waders,' p. 159, 1906) this attitude is one also of fear as well as of attack, challenge or solicitation to the male.

Having temporarily attached a husband she proceeds to make him build the little pad that serves as a nest, in which she condescends to lay four eggs, after which she considers her responsibility ended, and at once starts calling and showing off until she attracts another mate and lays another clutch of eggs. She certainly lays twice in a season and almost certainly three or four times, and there has been much circumstantial evidence to support this suggestion. Hume only caught males on the nest; Pitman says (Journ. Bomb. Nat. Hist. Soc. vol. xxi, p. 666, 1912):—"I then put two off three nests, which proved to be males. In this place I counted sixteen and shot nine; five of these were males and four females; there were however no more females, as the difference in sexes is very noticeable on the wing." Here we have a patch of breeding ground with four females and no less than twelve males. On one occasion I myself found two nests in a small patch containing one female and four males. In one nest the eggs were fresh, in the other on the point of hatching.

I do not know how long incubation takes.

Suborder GRUES.

(CRANES.)

Family GRUIDÆ.

(CRANES.)

(2036) *Grus nigricollis* Przewalski.

THE BLACK-NECKED CRANE.

Grus nigricollis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 52.

This fine Crane is a resident breeding bird from Ladak to Setchuan and Yunnan at very high elevations between 13,000 and 16,000 feet.

It breeds in considerable numbers round the higher Tibetan lakes and also by some of the lakes in Ladak.

The first eggs taken by Steen of this species are recorded by Dresser (*Ibis*, 1906, p. 347) but, since then, many more have been taken by Steen himself and by Kennedy, Bailey and others. Often this Crane breeds on the islands in, and the shores of, the big lakes in company with *Anser indicus*, of which there is a fine photograph by Bailey in the 'Journal of the Bombay Natural History Society' (vol. xix, p. 367, 1910).

The nest is described as varying very greatly. In some instances it is little more than a large shallow scratching in the earth made by the birds, perhaps with a scanty lining of grass and weeds, perhaps with none at all. In most cases, however, the hollow is well filled with moss and reeds and some nests, built on the islands or on the shores where the ground is wet and boggy, have been described as mounds of grass, weed and rushes with a large shallow depression for the eggs. One such nest was described by Macdonald as a flat affair about a foot high with a receptacle for the eggs roughly "2 hats wide by about 6 inches deep in the centre and showing up very conspicuously as a brown nest among the white down nests of the Bar-headed Geese, many of which surrounded the Crane's nest at short distances." Steen also described one of the nests taken by him on some marshy ground as "a big nest of rushes and grass."

The breeding season seems to be May and June. I have one clutch taken on the 16th of the former month, though most of the eggs sent me were found in June. Ludlow writes (*Ibis*, 1928, p. 220): "In Spring they retire to the lakes to breed. Eggs are deposited in May. The site chosen for a nest is generally a grassy island in the lake and the nest appears to be a very scanty affair, often a mere scrape in the ground."

The normal clutch of eggs is, as with all Cranes, two only, but possibly a single egg may sometimes be incubated. Most of the eggs sent to me were taken at 14,700 feet.

In appearance the eggs are just like those of the Common Crane except in being larger. Most of those I have seen have been a rather dull yellowish or olive-brown rather sparsely blotched with dull reddish-brown or purplish-brown, with still more scanty similar marks of grey or purple-grey. In all the eggs I have seen the blotches are more numerous at the larger end than elsewhere.

In shape the eggs are long ovals, very little compressed at the smaller end. The texture is coarse but fairly close, the surface smooth but not glossed and often with microscopical pits and corrugations.

Twelve eggs average 101.2×64.1 mm.: maxima 105.0×63.4 and 103.2×69.1 mm.; minima 96.4×64.1 and 99.3×59.6 mm.

Three eggs measured by Ludlow average 106.2×62.6 mm., giving an average for fifteen eggs of 102.9×62.4 mm.

I can find nothing recorded as to incubation and the bird's habits during and after the actual breeding time.

Antigone antigone.**THE SARUS CRANE.**(2038) **Antigone antigone antigone** (Linn.).**THE INDIAN SARUS CRANE.***Antigone antigone antigone*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 55.

Our Indian Sarus occurs from the Indus on the West to the district of Kamroop in Assam on the East. South it is found as far as Khandesh, in the Bombay Presidency, on the West, and as far as the Godavery River on the East.

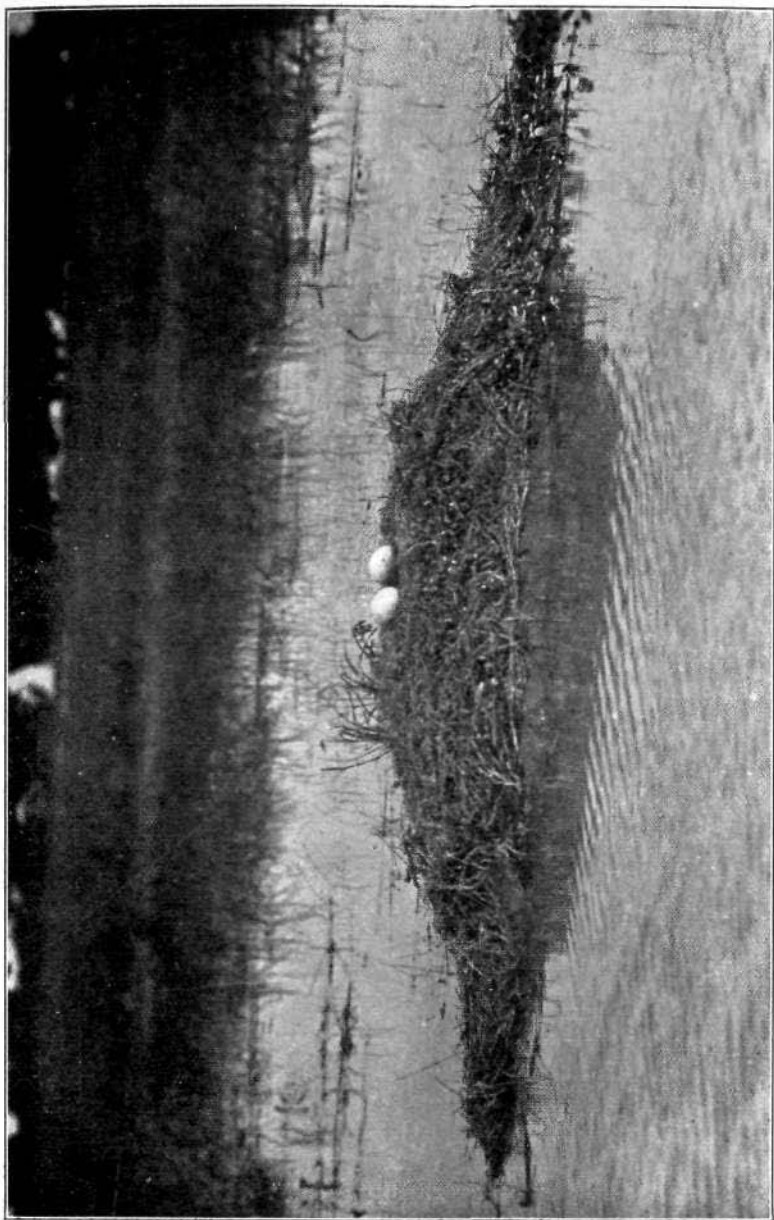
The Sarus Crane is resident wherever found, haunting wide plains with water adjacent or else the actual surroundings of swamps and lakes. Such lakes and plains may include cultivation, rice, wheat or any other crops; it may be waste, dry or wet ground, or it may be marsh-land interspersed with stretches of grass and scrub, but it will not be forest of any kind.

The birds generally select as a site for their nest some raised piece of ground in a marsh or an island in a lake, but occasionally they make it in the middle of a dry, open plain with no protecting water round about. Concealment never seems to be sought, rather they choose a place from which they can see danger from afar off. Jackals and other vermin have no terrors for these birds, for they are fully able to protect their young or eggs so long as they can see their enemies in time to get to the nest before they do.

Hume says:—"I have found it in dense beds of bulrush and reed, so lofty that, even standing on its nest, the bird was only to be seen by climbing a neighbouring tree. In these cases the rushes and reeds, where they were thickest, had been bent down across and across, so as to form a platform 5 or 6 feet in diameter, and on this a comparatively slight nest had been built."

The nest is made of straw, rushes, grass and any sort of material or rubbish which is handy, forming a heap of no great height—unless it is in swamp—but of considerable breadth. Nests in marshy land have been measured and found to be as much as 9 feet in diameter at the base and about 3 feet across the top, while in height they were 3 or 4 feet. Other nests on dry ground have been as small as 2 feet across and only a few inches in depth, but an average nest under such circumstances would be nearly 3 feet in diameter and from 6 to 12 inches in depth. The depression, if any, is very slight, the materials sufficing to keep the eggs from rolling, while as incubation advances a deeper hollow is soon formed by the weight of the sitting bird.

As a rule the Sarus commences to breed after the rains commence in June, most eggs being laid in July, August and September.



NEST AND EGGS OF THE SARUS CRANE.
(Bareilly, 27. 8. 30.)

Often, however, they breed still later, and odd nests are built and eggs laid in every month of the year. In Khatiawar, where the normal season is as stated, Capt. E. O'Brien found a newly hatched young one on the 12th February, and on the same date in another year Capt. Mosse found a partially incubated egg. In the Central Provinces Mr. F. E. Kemp obtained a pair of fresh eggs in March and Pershouse took a single fresh egg in December.

The clutch as a rule consists of two eggs, but often a single egg is incubated and, even when two are laid, it is rare for more than one to be hatched.

In shape the eggs are long ovals, often decidedly pointed; the texture, though very coarse, is close and hard and the surface is generally highly glossed, though invariably covered with innumerable tiny pits or pores, which sometimes collect the dirt and give the surface a speckled appearance.

The ground is white, exceptionally faintly tinted with pale reddish or sea-green; some few eggs are entirely unspotted but the majority are sparsely blotched with light reddish, deep reddish-brown or purple-brown, and with secondary similar markings of pale lavender and reddish-grey. The blotches, of whatever kind, are more numerous at the larger end than elsewhere. Occasionally an egg or a pair of eggs are rather more boldly marked with larger darker blotches, and I have one pair in which the markings are numerous enough at the larger end to form a cap.

One hundred eggs, including Hume's, average 104.4×64.3 mm. : maxima 113.2×69.8 mm. ; minima 93.2×65.0 and 105.5×52.8 mm.

The Sarus Cranes pair for life and are most devoted couples, and if one bird is killed the survivor is said often to die of grief.

The male seems to keep constantly near the nest when his wife is sitting and to guard it with jealous care in her absence, but I can find nothing recorded as to whether he takes a share in incubation.

They are bold birds and often seem to have no fear of human beings. Capt. O'Brien (in *loc. cit.*) relates how he first handled a chick and then his wife came and inspected it, the parent birds staying within about 30 yards and showing no concern, yet when they left and a Kite swooped at the chick the parents promptly attacked it.

On the other hand, Hume narrates rather a different story concerning a *syce* (a groom) whom he sent to rob a nest :—"As he commenced wading towards the nest the male began to dance about, flapping his wings and trumpeting most bravely; but when the man got within a few yards and landed safely on a patch of dry grass on which the nest rested, the male put his head down and ran off very crestfallen to a ridge in the water some 50 yards distant, whence he began with loud cries to encourage his lady not to allow 'that black rascal' to take any liberties. She sat quite still, neither moved nor cried, only as the man came close to her made

such vigorous pokes and drives at him that he got frightened and was picking up a great dry branch to strike her with, when I called out to him to flap her in the face with his waist-cloth, this he did and she reluctantly crept off the nest and joined the male." After the man had left with the egg the female returned to it and began throwing the materials of the nest in all directions, and when the male also returned went for him and furiously drove him away.

Both male and female "dance" occasionally at all times, but more especially in the breeding season. The cock bird usually starts the performance by picking up a straw or branch in his bill and then strutting with a dancing motion towards his lady-love. When within a few feet of her he bows, throws his head back, trumpets, and with wings spread dances a *pas seule* of half-a-dozen steps, each leg lifted high and quickly into the air, accompanied by a hop off the ground; a few more bowings and tossing of the head follow and then some more dance movements. This may go on for a few minutes, the female joining in or not as the mood seizes her, and then suddenly both start feeding again.

(2039) *Antigone antigone sharpei* (Blanford).

THE BURMESE SARUS CRANE.

Antigone antigone sharpei, Fauna B. I., Birds, 2nd ed. vol. vi, p. 56.

The present Sarus Crane takes the place of the preceding race in Eastern Assam, Burma, Siam, Cochin China and the Malay Peninsula.

The only way in which the haunts of this bird differ from the last is that in some districts it breeds in lakes and swamps where there is more forest. Two pairs I saw annually in the Lakhimpur district nested every year, one in quite a small swamp surrounded by virgin forest, the other in a patch of rice cultivation on the borders of a swamp and also more or less surrounded by scrub and forest.

In Assam we found it breeding in June and July, presumably because the swamps never dry up there and it is safe for the birds to commence breeding as soon as the rains start and food is abundant. In other countries, Burma, Siam, etc., the birds appear to breed at the same time as the Indian birds, *i. e.*, in July, August and September. Oates, Hopwood and Mackenzie all found them breeding in Pegu during these months, and I have had eggs sent me from Laitzin, South of the Chin Hills, taken in August.

The eggs, either two or one in number, cannot be separated from those of the Indian bird.

Fifteen eggs average 102.5×64.9 mm. : maxima 106.8×63.8 and 104.5×68.2 mm. ; minima 98.5×58.5 mm.

As to its breeding habits, all I can say is that it is a much wilder, shyer bird than *antigone*, and those we saw would never allow a close approach, sneaking off the nest long before we could get anywhere near it. This Crane, when building in swamps, is said to raise her nest when heavy rain threatens to flood it just as the Indian bird does, for Hume says that he himself has seen "the birds very busy raising their nests."

Suborder OTIDES.

(BUSTARDS.)

Family OTIDIDÆ.

(BUSTARDS.)

(2043) *Choriotis nigriceps* (Vigors).

THE GREAT INDIAN BUSTARD.

Choriotis nigriceps, Fauna B. I., Birds, 2nd ed. vol. vi, p. 64.

This magnificent Bustard occurs in Sind, the Punjab, East to the Jumna River and South to Rajputana, Guzerat and the Bombay Deccan. In all these it is resident and breeds. It straggles over a wide area and has even been shot in Bihar in the East and Ceylon in the South, but these are Winter wanderers and the actual breeding limits are roughly those given above. It is possible also that they still breed in the Mirzapur district, for Mr. G. O. Allen thinks that this is so.

It is a bird essentially of wide open plains of a desert or semi-desert character. In Jerdon's words, "The Bustard frequents bare, open plains, grassy plains interspersed with low bushes, and occasionally high grass runnals. In the rainy season large numbers may be seen together stalking over the undulating plains of the Deccan or Central India. A writer in the 'Sporting Review' states his belief that they are never seen in any district that is not characterized by hills as well as plains but this I would interpret that they do not frequent alluvial plains, but prefer the undulating country, for I have seen them on extensive plains where there were only a few ridges or eminences, and nothing deserving the name of a hill close at hand."

In Mysore, where they are almost certainly only Winter visitors, Sanderson found them plentifully distributed "in open plains in the vicinity of scrub-jungle." It is still apparently not uncommon

in Khandesh, and is here sometimes found in cultivated country. As regards the site actually occupied by the nest, this varies a good deal. Undoubtedly the favourite position is in a grass field, "Berhs" as they are locally called, and preferably in a patch of grass which is not too thick. Hume notes:—"The situation varies, sometimes the nest is in an open waste, sparsely dotted with a few herbaceous shrubs, often in the stubble of the giant bulrush millets, and still more often in clumps and patches of high thatching grass, or the dense, soft lemon-grass so characteristic alike of the haunts of this Bustard and the Houbara."

Harrington Bulkley, who found more eggs of the Bustard than anyone else has ever done with the exception perhaps of Khan Nizam-oo-din Khan, informed me that he took nearly all his eggs in grass-land. Here and there the grass was very dense and long, but the eggs were all laid where it was thinner and only some 3 or 4 feet high. All his eggs were taken in the vicinity of Kharagoda in Guzerat, and the Khan, who took over a hundred eggs of this Bustard round about Arneewalla, in Sirsa, also says that "the eggs were discovered in waste ground, rather high and dry, dotted over with tufts of a species of lemon-grass."

The normal breeding season is July to September, but birds seem to breed off and on at all times of the year. Khan Nizam-oo-din Khan took most eggs in these months but also in each month March to June. Harrington Bulkley also found more eggs in the normal breeding months than in the others, but found one or more eggs in each month from October to June except January and, on the 27th of this month, Kemp took an egg in the Rann of Cutch.

Only one egg is laid, and when two are found close together they are almost certainly the produce of two birds. Once the Khan found two eggs together but one was on one side of a tuft of lemon-grass and the second on the other side, while in two other cases two eggs were found just a yard or so apart.

Harrington Bulkley once found two eggs actually together, within a few inches, but even these he believes to have been laid by two birds.

The eggs are quite typical Bustard's eggs. In shape they vary from rather broad to fairly long ovals, the smaller end very little different to the larger. The texture is extremely close, hard and rather fine for so big an egg; the surface is smooth, sometimes with a slight gloss, sometimes with the gloss highly developed.

The Khan obtained a really wonderful series of the eggs of this species and, among the eggs taken by him, there are many types and exceptionally coloured eggs such as I have seen nowhere else. The great majority of eggs are olive, olive-brown, sometimes with a very faint tinge of yellowish, and sometimes almost pure brown. The whole surface is faintly flecked, blotched or smudged with darker tinted marks of the same colour as the ground. Occasionally these

may be fairly well defined, but on most eggs they are very faint and in many obsolete or absent.

Some of the queer-coloured eggs taken by Khan Nizam-oo-din Khan are described by Hume as follows :—"The first of these has a bluish-green ground, thinly spotted and blotched with deep umber-brown, and towards one end there is a pretty conspicuous zone of spots and blotches, most of a pale purplish-brown. The next egg is a pale olive-brown, with more of a greenish than a brownish tinge, clouded, spotted, blotched and streaked, but everywhere thinly, with brown, only slightly darker than the colour of the egg, but altogether an umber instead of the olive of the ground. The next is a yellowish stene-colour, pretty thickly, but very faintly, clouded and streaked with a deeper and slightly redder tint.

"The next egg has but very little gloss and is a nearly uniform dark olive-brown, with only the faintest traces here and there of streaks of a darker tint. The next is an excessively glossy egg, of the same colour, everywhere thickly clouded and mottled with a slightly darker and more ruddy shade of brown. The last egg is of much the same colour as the preceding ; there is a conspicuous cap of nearly confluent clouds and blotches of a redder brown than the ground of the egg."

Yet another beautiful type I have seen is a truly cyanic egg, the whole surface a pale unspotted glossy blue.

Eighty-eight eggs average 79.4×59.6 mm. : maxima 88.7×61.0 mm. and 80.5×61.3 mm. ; minima 68.0×55.5 and 82.5×53.5 mm.

This Bustard is—like all other Bustards—really polygamous, and its display has been described both by Jerdon and Hume. The former says :—"At the breeding season the male struts about on some eminence puffing out the feathers of his neck and breast, expanding his tail and ruffling his wings, uttering now and then a low, deep moaning call heard a great way off."

Hume comments on this :—"The way in which the male expands the throat at times during the breeding season is most remarkable. First the male begins to strut about holding his head up as high as if he wished to lift himself off his feet. Then after a few turns he puffs out the upper part of his throat under the jaws, then draws it in again, then puffs it out again and so on, two, three or four times, and then suddenly out goes the whole throat down to the breast, and that part of it next the latter swells more and more, his tail, already cocked, begins to turn right back, over the back, and the lower throat-bag gets bigger and bigger and longer and longer, until it looks to be within 6 inches of the ground. All the feathers of the throat stand out, and looked at in front he seems to have a huge bag covered with feathers hanging down between his legs, which wabbles about as he struts here and there with wings partly unclosed, and occasional sharp snappings of the bill. From time

to time he utters a deep moan and stands quite still, and then off he struts again close up to the female, and then away from her. On both occasions I have seen these antics the excitement seemed gradually to relax, and no connubialities resulted. 'Whether this is usually a prelude to such or a mere nautch for the edification of the female I cannot tell, but I am inclined to believe the latter.'

(2045) *Sypheotides indica* (Miller).

THE LESSER FLORICAN OR LIKH.

Sypheotides indica, Fauna B. I., Birds, 2nd ed. vol. vi, p. 69.

The breeding range of this little Bustard as defined in the 'Fauna' is "South-Eastern Punjab, Guzerat and South Sind through Rajputana, Deccan and Western Central India to North Mysore and Madras." Outside this area they occur less commonly and less regularly. To the East it occurs and has been obtained by O'Donel as far as 50° East of the Teesta; it has also been known to occur and to breed as far South as Trichinopoly. Other places as wide apart as the Nilgiris and the Valley of Nepal have been visited by this Florican, though there is no record of its breeding.

Hume considered it to be partially migratory, and says:—"Although a certain number are probably permanent residents of Khandesh, Nasik and Ahmednagar, the real home of the Lesser Florican is in the drier portions of the Peninsula, lying east of the Western Ghâts and south and east of the Godavari.

"It is of course confined to plains and open country, and does not ascend any of the hills, though a single specimen was once killed, I hear, on the slopes of the Nilgiris, between Neddiwatam and Pykarra.

"During the rains, when it breeds, although many breed in the Deccan, as, for instance, about Sholapur, the majority I think move northwards and westwards, extending over the western parts of the Central Provinces, the Central India Agency, the southern and central portions of Rajputana, Khandesh, Guzerat, Cutch, Khati-awar and northern Sind."

In 'Game-Birds' (vol. ii, pp. 203-5, 1921) I have given the places where it has occurred casually at great length, but these are not in the normal breeding area and need not be repeated here. The breeding ground of the Likh is never, I believe, in really desert or bare country, and it prefers above all others situations large expanses of grass-land where the grass may be anything from 3 to 5 feet high, and especially in the "Bhirs," where there are some thinly grown spaces in which they can move about easily. They are often found in grain crops of various sorts and even in green crops and occasionally in thin scrub- and bush-jungle.

The nest is merely a natural hollow, or one scratched in the soil by the birds, in among the roots of the grass. Wenden found the eggs laid in hollows washed out by the rains in the roots of tufts, but other eggs found by him were just laid on the bare ground in open spaces. When they breed in scrub, which is not often, the eggs are placed under the shelter of a bush just on the ground with no nest. Of course when they are laid in hollows these sometimes contain scraps of sorts, though these are not placed there by the birds. Alexander says that they prefer to other places thin grass near water, but no one else appears to have noticed their predilection for water.

The months in which most eggs are laid are August and September and a good many in late July and October. Other birds may be found laying at odd times up to January. In Khatiawar the birds sometimes commence breeding rather earlier, and Fenton says that they arrive in June for breeding purposes in great numbers. In the Vidal Collection I found a single egg marked Malda, Bengal, and a note in his diary to say that it was taken on the 12th March. The time is unusual and the place is the farthest East that the bird has ever been known to breed.

The number of eggs laid is nearly always four, rarely three or five. Wenden, in Sholapur, found two eggs only in a nest and, though he waited, no more were laid. Alexander in the same place found "three to five," while Rhodes Morgan again notes that "two is the usual number."

The eggs are indistinguishable from those of the Little Bustard. In shape they are spheroidal, occasionally one end a trifle pointed. The texture is fine, close and hard, the surface very glossy and the shell very strong.

In colour the majority of eggs might be described as olive-grey; others are olive, olive-brown or brown, and some Hume describes as "clear, almost sap-green." Occasionally one finds a clutch almost stone-coloured, and I have one very beautiful pair which is a pale green-grey, almost silver-green-grey.

The markings are never bold and generally consist of feeble blotches, often rather longitudinal in character, of a rather darker, and sometimes a more reddish, brown than the ground-colour. They are always rather sparse, though less so on the larger end than elsewhere, and in some eggs almost indistinguishable from the ground itself. In only one pair of eggs have I seen the markings contrasting at all boldly with the ground.

Fifty-seven eggs average 49.1×41.3 mm.; maxima 52.0×42.8 and 49.0×44.0 mm.; minima 46.2×39.2 mm.

The Lesser Florican seems to be neither monogamous nor polygamous, but absolutely indiscriminate in its love affairs. The females during the breeding season and before they have settled down to egg-laying and its attendant duties probably wander

about a good deal, while the cock bird seems to stay in one place and endeavours to attract the females to him. This he does by leaping into the air some height above the surrounding grass or bushes in a manner which has often been described. Davidson writes (Hume's 'Nests and Eggs,' vol. iii, p. 381) about the cock birds:—"Their whereabouts is generally easily discovered by their frog-like call, and their occasional sudden jumps up into the air. They do not seem to call much when the sun is bright, but chiefly in the morning and on cloudy days. I am inclined to consider these sudden flights as simply one of those bridal displays so common in the males, especially in gallinaceous birds."

Wenden watched the birds for some time, and narrates how he saw the performance: "From the tree in which I sat with my binoculars, I saw her running rapidly from the dense *Karda*, across the open and into the sandy patch in which was her egg. Here she moved about for some minutes feeding, and every now and then she sprang into the air with a low clucking cry, which was answered by the male bird from the *Karda*, though I could not see him. Then, as though a sudden thought had struck her, she darted to her nest, and after one or two springs and walking round and round the egg she squatted and deposited another. While she sat she was quite silent, but the male bird, who had now advanced closer to me, kept springing in the air and crying continually. The operation of laying the egg seemed to last about 20 minutes,—i. e. from the time she sat to the time she rose; and having made another spring or two, walked round the eggs and then made straight tracks for the dense grass where the male bird was calling."

He adds later that he again "saw both birds spring several times silently" when disturbed by a man with cattle.

Other observers say that the jumping is confined to the male bird. Davidson says he has seen but one female jump, and that might have been a young male in immature plumage. Alexander also notes:—"The mating season commences at the close of August or the beginning of September, at which time the male bird begins to jump in the grass. This jumping is almost entirely confined to the male bird, and ceases as soon as the mating season is over. The act of jumping is always accompanied by a call, very like a frog's croak."

Jerdon says that the male bird generally conducts his performance from some elevated ground and that they are very pugnacious, two cocks engaged in battle being so absorbed in it that they allowed him to approach within 30 yards before ceasing.

Bulkley told me incubation took about three weeks.

Houbaropsis bengalensis.**THE BENGAL FLORICAN.**(2046) **Houbaropsis bengalensis bengalensis** (Gmelin).**THE BENGAL FLORICAN.***Houbaropsis bengalensis*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 71.

Delacour and Jabouille having separated the bird found by them in Cochin China under the name of *H. b. blandini*, our bird has to bear a trinomial, while its habitat is restricted accordingly.

It is found in Bengal, Assam, Bihar and Oude, extending as far West as the Kuman Terai. East it occurs in the districts of Commilla and Chittagong East of the Bay of Bengal.

This Florican is found only in the enormous grass "churs" on the banks of the Ganges, Brahmapootra and other great rivers traversing the provinces referred to above or in the vast stretches of grass-land running along the base of the foot-hills of the Himalayas. So far as I know it is in these alone that it breeds, and though it enters cultivation of all sorts it is only for the purpose of feeding.

In the Surma Valley it is rare and possibly only a casual visitor, but in the Brahmapootra Valley it is still common in many places on the South of the river. In most Bengal districts it has become rare or entirely absent owing to the encroachment of villages and cultivation replacing so much of the grass-land.

The great majority of birds breed in grass areas at considerable distances from villages and cultivated fields. Perhaps more birds breed in the huge grass plains, interrupted by swamps, which occupy so much of the districts of Kamroop and Goalpara North of the Brahmapootra, than anywhere else. At the same time the first clutch of eggs I ever took was found for me by a Mikir in Sadya. They were laid in a bare patch of an extensive field of grass close to a village, the cattle and buffaloes of which had regularly fed over it. In consequence the grass was neither very thick nor very high and was cut up in all directions by cattle-paths worn by the animals as they fed.

Very different to the above nest so close to a village were the sites chosen by the birds laying the eggs which were comprised in a wonderful series taken for me by an Indian friend in Goalpara. With the eggs he sent me a letter, which runs as follows:—"A Florican only lays two eggs in the breeding season (April and May). Dense forests infested with ferocious animals, scarcely trodden by men, are places where the eggs are laid on the ground. The bird takes great precautions to conceal her eggs, and you can hardly find any eggs within a quarter of a mile from the place where a Florican is seen to rise when first disturbed. She creeps through the forest

unobserved to a great distance to lay her eggs. 'A very careful and extensive search is required to discover them.' The forest my friend alludes to is, of course, of grass, in places 10 feet high, but generally only 3 or 4 feet high where the birds breed. The dangers are not exaggerated, for one of my best collectors was killed by a tiger when engaged upon marking down nests of the Florican, and others also had narrow escapes from other animals.

Hodgson gave a capital *résumé* of this bird's breeding, although most of it was collated from what his collectors told him: "The Florican is neither polygamous nor monogamous, nor migratory nor solitary. These birds dwell permanently and always breed in the districts they frequent, and they dwell also socially, but with a rigorous separation of the sexes. Four to eight are always found in the same vicinity, though seldom very close together, and the males are invariably and entirely apart from the females after they have grown up. Even in the season of love the intercourse of the sexes amongst adults is quite transitory and is conducted without any of that jealousy and pugnacity which so eminently distinguish most birds at that period.

"In the season of love the troops of males and females come into the same neighbourhood, but without mixing. A male that is amorously disposed steps forth, and by a variety of very singular proceedings, quite analogous to human singing and dancing, recommends himself to the neighbouring bevy of females. He rises perpendicularly in the air, humming in a peculiar tone and flapping his wings. He lets himself sink after he has risen some 15 or 20 yards, and again he rises and again falls in the same manner and with the same strange utterance, and thus perhaps five or six times, when one of the females steps forward and with her he commences a courtship in the manner of a turkey-cock, by trailing his wings and raising and spreading his tail, humming all the time as before. "The procreative instinct having been satisfied, the female retires into deep grass cover, and there, at the root of a thick tuft of grass, with very little semblance of a nest, she deposits two eggs, never more, never less.

"The female sits on her eggs about a month and the young can follow her very soon after they chip the egg.

"In a month they are able to fly, and they remain with the mother for nearly a year or until the procreative impulse is again felt by her, when she drives off the long since fully grown young. Two females commonly breed near each other and thus the coveys usually consist of four to six birds. The Florican breeds but once a year in June-July."

In Purnea and Malda Shillingford obtained eggs in June, and Whympster took eggs in that month and believes it is the usual month for the birds to lay in.

In Assam June-July are certainly *not* the breeding months. I have taken eggs as early as the 28th February and, while most are laid in March and April, a few may also be obtained in May

and June. The only eggs recorded in July were four eggs well covered with water in flooded grass-land. These were found by a friend when out after tiger, and had probably been laid not later than the middle of June when the water rose.

Out of eighty-four eggs recorded by me and found in Assam no less than fifty-nine were taken in March and April.

The number of eggs laid is invariably two; I have never seen or heard of three being laid, while the Indian collectors say that sometimes one only is incubated.

In shape the eggs are typically very regular ovals, the two ends being almost equal. In proportion of length to breadth they vary considerably, but in other respects very little. The texture is fine, close and very hard, but the shell is not thick. The surface is very highly glossed.

In colour the eggs are very like those of the Great and Little Bustards. The ground-colour is olive-green or olive-brown, in some the green predominating, in others the brown, while a few eggs are brown with no tinge of olive at all. I have also seen a few eggs which might be termed sap-green with no tinge of brown, but these are rare. Occasionally there is a yellow tinge, but this also is exceptional. The markings consist of scanty and generally faint freckles, splashes and blotches, usually longitudinal in character, of brown and purple-brown, rather more numerous at the larger end than elsewhere. The intense gloss makes any of these eggs handsome, and occasional eggs, especially the green ones with the blotches darker than usual, are very handsome.

One hundred eggs average 64.3×45.8 mm. : maxima 76.6×46.1 and 67.0×48.0 mm. ; minima 60.4×45.0 and 57.9×42.5 mm.

The nests are very hard to find, as the hen bird never gives them away, but nearly always rises a couple of hundred yards from the intruder, while the enormous areas of grass she often selects to nest in makes marking down the point when she does show herself very difficult. My men used to work with little flags on sticks 7 or 8 feet long. When a bird rose one flag was immediately stuck in the ground where the man was standing and another as near the point as possible whence the bird rose. Somewhere in a direct line between these two the nest and eggs probably lay.

There is little one can add to what Hodgson has said about their nuptial performances, but from what I have seen I do not think they are pugnacious. The male performs his leaps and dances and the female when she feels so inclined goes to him and accepts his attentions, after which neither bird displays the slightest further interest in the other. Should she again desire the male and the same bird is nearest she visits him, but if another is nearer he takes the place of the first. I think this often occurs, as in one patch of grass in the breeding season two or more males may be displaying and two or more females watching them.

Hodgson says that incubation takes about a month, and this is confirmed by native observers. It is, however, rather difficult to

estimate, as I have often seen a considerable difference in the state of incubation in a pair of eggs, and it would appear that the two are usually laid at considerable intervals, possibly the second after three or even four days lapse. This would infer that the female commences incubation the day the first egg is laid, but this is not always so, as I have also often found both eggs in exactly the same condition of incubation, and I have known females visit and accept the male after one or two eggs had been laid.

Order IX. CHARADRIIFORMES.

Suborder OTI-LIMICOLÆ.

(STONE-POVERS.)

Family BURHINIDÆ*.

(STONE-POVERS.)

Burhinus oedonemus (Linn.).

THE STONE-POVER.

(2047) *Burhinus oedonemus indicus* (Salvadori).

THE INDIAN STONE-POVER.

Burhinus oedonemus indicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 77.

This bird, which is a near relation of the one which in England rejoices in the names of Thick-knee, Goggle-eyed, Stone or Norfolk Plover, is found all over India except Sind, the Mekran and Baluchistan; it occurs also in Ceylon, Burma, South-West and Central Siam.

Most often, I think, our Indian bird selects dry open country in which to breed, but it will not be found in the most arid desert tracts where there is no cover. It chooses open wastes with patches of grass, a little bush or scrub-jungle or even such as are nearly entirely overgrown with one or the other. It also breeds frequently in fallow or cultivated land near such wastes, sometimes in those ploughed but in which no crops have yet started growing and, also, though rarely, sometimes actually in growing crops. In the North-West of India, as Hume says, the favourite site for a nest is in a Mango-orchard where the grass or undergrowth has been left standing

* As *Oedonemus* is antedated by *Burhinus* as a generic name, the name for the Family must be *Burhinidæ*.

and is fairly thick. In one such orchard Hume found no less than thirteen nests, while there were other birds present which would probably have nested and laid later on.

Sometimes also this Plover breeds on sand-banks in rivers or on their sandy shores, but nearly always where there is some cover. Wherever it breeds it seems to prefer to lay its eggs under the shelter of cover of some sort, a small or big bush, a tuft of grass or bunch of weeds, a prickly Euphorbia or a few wisps of Mare's-tails, and three out of four nests will be found so protected. Even in ploughed fields or in waste ground the eggs are usually under the shelter of a clod or stone, but at other times they are placed quite in the open. Thus Blewitt says of one nest, "a bare, open plain was the situation chosen," while I have myself taken eggs from shingle beds with no vegetation and others from a ploughed field with no cover of any sort.

The nest is merely a scrape in the ground, generally scratched out by the birds, but sometimes a natural one. There is no lining except for such oddments as fall or are blown into the hollow.

The breeding season is a long one. Most eggs are laid in April and May, the two hottest and driest months, but I have eggs in my own series taken in every month from January to July; Hume took two eggs in August, and I have known another pair taken in October. In Ceylon Parker states that they breed from May to October.

The normal clutch is undoubtedly two eggs only and I have never taken three. Hume, however, found about one clutch in ten of this number; Jerdon also says they sometimes lay three, and Blewitt found a nest with three eggs near Hansie. Other collectors all speak of two eggs only; thus Marshall in Saharunpore; Beavan in Manbhoom; Butler near Deesa; Brooks near Etawah; Jesse round Lucknow; Coltart, Inglis, Lindsey Smith, Harvey and others in Bihar; Primrose in Kurseong, and Whymper in Kuman never found more than two eggs, and I still think three must be quite an abnormal number.

The eggs are very handsome as a series, much more so than those of the British bird, but otherwise practically every egg can be matched except in size. The ground-colour varies from a pale yellowish, creamy or greyish-white to a warm buff or cream. The markings vary a good deal but, generally, consist of large and small blotches and smudges of brown and blackish-brown, sometimes with a strong tinge of purple or reddish, while the secondary markings, of the same character, are of neutral tint or grey. In some eggs the blotches are very large and comparatively few, in others quite small and numerous. Occasionally the specks and blotches are mixed with short hair-lines and hieroglyphics, and in a very few eggs the markings consist entirely of these. A very queer pair taken by Brooks has one egg pale grey with tiny specks of reddish-brown scattered over it, while the second egg is a very deep dull buff, the

whole surface mottled finely with blackish-brown and dull grey. These eggs, now in my collection, are probably those referred to by Hume on p. 333, 'Nests and Eggs,' 2nd ed. Occasionally eggs have the markings chestnut in colour, and these are very handsome.

The texture is moderately fine, the shell fragile in proportion to its size and the surface smooth, but glossless, or nearly so.

In shape the eggs vary from broad to long ovals, generally quite obtuse at the smaller end, rarely rather pointed.

Sixty-eight eggs average 47.6×34.7 mm. : maxima 52.0×34.2 and 48.1×36.2 mm. ; minima 44.0×34.0 and 50.3×32.0 mm.

The birds pair for life and the male is a good husband and father, but he does not help in incubation. The female sits fairly closely, but generally sneaks away from her nest while the intruder is still a hundred yards or so away from her. She often leaves the eggs during the warmer hours of the day if they are effectively shaded but, if exposed to the hot sun, she either sits on or beside them, shielding them with outstretched wing. The young when born are very helpless compared with the young of Plovers and Waders, and it is some days before they can take care of themselves.

(2048) *Burhinus oedienemus astutus* Hartert.

THE PERSIAN STONE-POVER.

Burhinus oedienemus astutus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 79.

This Stone-Plover comes within Indian limits in Mekran, Sind and along the Baluchistan and Afghan frontiers. Outside India it is found in Turkestan, Mesopotamia and Persia.

This race breeds in even more desert country than the Indian form but, with this exception, there is little more one can note about it. It is very common in many—perhaps most—parts of Sind, where Harrington Bulkley, Scrope Doig and Eates have taken many nests round Karachi and elsewhere. Bulkley told me that the eggs he found were nearly always placed under the protection of some tuft of withered grass or under a small bush, and he even found them breeding in quite thick tamarisk-scrub. Rattray found them breeding near Dera Ismail Khan "on ground among stony, broken low hills, under small thorn-bushes." In Mesopotamia Pitman and Aldworth found the eggs laid on sun-baked mud-flats.

The nest is the usual unlined scrape in the ground.

The eggs are indistinguishable from those of our Indian bird except that, as one would expect, they average larger.

Fifteen eggs average 48.7×36.5 mm. : maxima 51.2×37.4 and 49.0×38.0 mm. ; minima 46.6×36.5 and 48.0×35.0 mm.

Ticehurst says (Ibis, 1923, p. 648) :—"The few I saw were nearly trodden on or flushed by beaters when out shooting." So apparently this race is less easily frightened than is the common race.

(2049) *Esacus recurvirostris* (Cuvier).

THE GREAT STONE-PLOVER.

Esacus recurvirostris, Fauna B. I., Birds, 2nd ed. vol. vi, p. 80.

The Great Stone-Plover is found over practically the whole of Ceylon, India and Burma, extending to Hainan.

This Plover normally breeds only where there are large rivers, making its nest on sand-banks, shingle and sand-islands in the river-beds and, occasionally, in small sandy or shingly inlets running into the fields on either side.

Wait found a nest with two eggs on a small island in the Minneri Tank, a piece of water of about 4,000 acres in Polan Nasawa in the North-East Province of Ceylon, where it was breeding in the company of some Swallow-Plovers.

Marshall by mistake recorded it breeding on a ploughed field, and Bingham also recorded finding two eggs at "the edge of a ploughed field close to the Ganges, while Oates says that he found at Pegu "a nest on May 1st with two fresh eggs in fallow-land." Later Marshall found he had mistaken the eggs of the Common Indian Stone-Plover for those of this species, and it is possible Bingham and Oates made the same mistake.

In Assam, on the Brahmapootra and its tributaries, they nearly always selected shingle-beds in which to scratch out the shallow, unlined hollow which serves as a nest. Occasionally, however, they were laid on the bare sand, and over most of India and Burma sand or shingle seems to serve their purpose equally well. They seem to have a curious liking for the company of the Swallow-Plover. Most of the eggs I have found have been on sand and shingle-banks where these little birds also had colonies breeding. Jesse near Lucknow, Betham on the Sutlej, Hopwood on the Chindwin, Wait in Ceylon and other observers elsewhere have remarked on these two species breeding in company. Of course they sometimes also breed on banks occupied by other birds, such as the Spur-winged Plover, the Black-bellied Tern and so on, but with none so regularly as with the tiny Swallow-Plover.

As a rule I think the scrape is made where there is no shelter of any sort, and generally rather low down near the water, so that any sudden rise drowns them out. One pair of eggs I found on a shingle on the Pobha River in Assam on the 17th April some 5 or 6 feet from the edge of the stream had 10 feet of water rushing over them the same evening.

The breeding season is very restricted and nearly every egg is laid between the 15th February and the 15th April, while in the North-West, where the dry season lasts longer, I have had eggs taken in May, though these may have been second laying to replace others lost or destroyed. As the eggs have to be hatched, a matter of

over three weeks, and the young sufficiently advanced to move about, early breeding is essential and, even then, early rainfall causes enormous loss of their eggs by flooding the rivers before they have had time to hatch.

Two eggs only are laid and, so far as I know, never three or one. The birds do not breed in colonies, but two or three pairs may sometimes be found breeding on the same bank or island.

In texture the eggs resemble those of the smaller Stone-Plover, but in shape they are proportionately longer.

In colour and markings they closely resemble the eggs of *Burhinus* but, taken as a series, eggs marked with lines, scrolls and hieroglyphics rather than with blotches are proportionately more numerous. At the same time some eggs are blotched very boldly and handsomely.

A rather exceptional pair has the ground a warm buff, the whole surface freely blotched all over with small rather long blotches of light chocolate-brown.

Sixty eggs average 54.4×41.0 mm.: maxima 57.1×43.6 and 55.1×43.8 mm.; minima 50.1×39.0 and 53.2×38.1 mm.

Orthorampus magnirostris.

THE AUSTRALIAN STONE-POVER.

(2050) *Orthorampus magnirostris magnirostris* (Vieill.).

THE AUSTRALIAN STONE-POVER.

Orthorampus magnirostris magnirostris, Fauna B. I., Birds, 2nd ed. vol. vi, p. 81.

Within our limits this, the largest of the Stone-Plovers, is found in the Andamans and in the islands of the Mergui Archipelago (Kloss). Thence, unless one splits up the species, according to Mathews, into many races, it extends through the Malay States and the islands to Australia. If races are accepted this bird would bear the name *scommophorus* of Oberholser, given to the Tamhulan Islands form, which seems to be identical with the present bird, or *neglectus* of (*vide* Mrs. Meinertzhagen) Mathews.

The eggs of this bird have only been taken by Hume on the Little Cocos, by Wood-Mason near Port Blair and by Monsieur Bonig on Cinque Island. In Australia, of course, the egg has been taken several times, though considered a rarity and hard to get.

Unlike our Great Stone-Plover, which frequents rivers, this Plover is purely a coastal bird, scratching a hollow for its egg—it only lays one—just above high-water mark on the sea-shore. No nest is constructed, a hollow being made either in the débris on the high-water line or on the shingle and sand just above it.

The breeding season in the Andamans is March and April, so far as is known at present. In Australia they apparently breed from August to November.

The eggs generally have a white, creamy or very pale buff ground handsomely blotched and spotted with black or brownish-black, with secondary or subsurface markings of neutral tint or inky-grey. In a few eggs the secondary markings are more numerous than the primary, but in most the reverse obtains. In one or two eggs the markings are small and very scanty, in most large, bold and fairly plentiful. Two eggs are different to all the rest. The ground is a very pale yellowish-stone and the whole surface is profusely covered with blotches and mottlings of grey-brown and pale grey. Most of the markings are small and smudgy, a few rather larger. I should note, however, that Mr. Charles Orton thinks that it is possible that these eggs may be those of another similar Stone-Plover whose normal eggs are of this type. All the Andaman eggs are of the first description given above.

Fifteen eggs average 63.7×45.0 mm.: maxima 68.5×44.3 and 64.2×47.1 mm.; minima 60.2×42.8 mm. A pigmy egg measures 54.3×41.0 mm.

Suborder LARO-LIMICOLÆ.

Family GLAREOLIDÆ.

(COURSERS and SWALLOW-POVERS.)

Subfamily CURSORIINÆ.

(COURSERS.)

(2052) *Cursorius coromandelicus* (Gmelin).

THE INDIAN COURSER.

Cursorius coromandelicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 86.

The Indian Courser is found in the drier, more open and desert portions of Northern Ceylon and all India, from Sind to Western Bengal. It is, of course, absent from the wettest and most heavily forested areas, but is common in the deforested areas in Travancore, becoming rare on the Malabar coast. It occurs in Cutch, the North-West Provinces and in Rajputana, but is said generally not to be found in the purely desert portions. As regards Sind, however, Ticehurst remarks (*Ibis*, 1923, p. 649):—"In the desert parts of

Lower Sind it is quite common, but is rather patchily distributed. Round Karachi it may be met with in winter on the bare desert, and it seems to prefer the more stony parts, while in similar country between Jhimpir and the Indus I found it abundant in the breeding season."

This Courser is a bird of wide open spaces, bare fields and fallow ground and, like all other Coursers, is never found in forest or in green cover and but rarely in scrub that is at all thick. Hume remarks that while the Cream-coloured Courser is a bird of areas with a rainfall of 15 inches or less, this bird is an inhabitant of those districts with a rainfall between 15 and 45 inches. Roughly this means that on the whole it is a breeding bird on dark lands, not on sandy deserts. The nidification of the two Coursers give a very fine example of adaptation to their surroundings. The Cream-coloured Courser lays eggs yellow-grey in colour on a yellow-grey sand, the Indian Courser lays a very dark blotchy egg on a dark soil. There is no pretence of a nest; the eggs are just laid on the ground, sometimes in a hollow, sometimes on the flat, but of lining there is no sign and of protection generally none, though a few eggs may be deposited where a bush or tuft of grass to some extent keeps off the midday sun.

Wenden says:—"The eggs are deposited upon the ground without the slightest sign of nest, and in the barest and most open plain." Marshall (C. H. T.) writes:—"There are few more difficult eggs to find than those of this Courser. The eggs are laid on the bare earth where there is no grass, and so like are they to their surroundings that, although within 3 yards of a couple of eggs, we were for some time unable to make out their whereabouts."

Pitman found it breeding freely near Dera Ismail Khan, all his eggs being found on "black broken ground, sometimes rocky, but generally fallow, the eggs so like their surroundings that they could only be found by watching the birds on to them."

Bulkley took many nests near Kharagoda in Cutch, but "always on dark soil." Even in Travancore, where Stewart took many eggs, and on the Malabar coast, where he found a pair, he says: "eggs laid in the débris and among stones just like the eggs and very difficult to find."

In the Central Provinces McArthur found them common near Sirsa, but "almost impossible to find the eggs, as they are laid without any nest, in the bare ploughed fields."

It is unnecessary to add to the above notes, which may be summarized as showing that the ground selected is bare dark earth, ploughed and fallow fields, or, where these are not available, on shingly coasts where the débris and stones are simulated very closely by the eggs themselves.

The breeding season in Central India appears to be from April to June, in Western India from March to July, and in Travancore May to July, while in Rajputana, round about Kotah, Livesey found

eggs from March to May. In Sholapur Wenden took eggs as late as July and Davidson found them breeding from March to August.

The eggs are very handsome. The ground-colour varies from a pale yellowish-stone to a rich yellow-buff, and the markings consist of blotches and smears or endless twisted lines and scriggles of black which cover the greater part of the surface. In some eggs the blotches outnumber the lines and in a few there are no lines, and in these the blotches stand out very boldly. In many other eggs there are no blotches and all lines, while in others again the markings are mostly large smears. In most eggs there are underlying blotches and lines of leaden-grey, but these are always very subordinate to the black. Occasionally the markings are more brown than true black, and I have seen one clutch in which they are reddish-brown.

I have seen no eggs which bear any colour resemblance to the eggs of *Cursorius cursor* beyond character and texture. In shape they are broad blunt ovals, the texture fine but not close, and the surface, though smooth, not glossy.

Sixty eggs average 30.4×24.1 mm.: maxima 34.1×23.9 and 31.5×26.1 mm.; minima 28.2×23.1 and 30.2×22.1 mm.

So far as I am aware only the female incubates, though the cock bird is said to stay by the nest when his wife is sitting. Unlike the Cream-coloured Courser she often sits very close and only creeps away at the last moment.

(2053) *Rhinoptilus bitorquatus* Blyth.

THE TWO-BARRED COURSER.

Rhinoptilus bitorquatus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 88.

This Courser is found in the country from the Godavery Valley to the neighbourhood of Madras. Jerdon discovered it in Nellore and also saw it at Cuddapah, while Blanford obtained it at Sironcha on the Godavery and again at Bhadrachalam. Finally Howard Campbell, in 1900, saw it at Anantpur, much farther West.

Unlike other Coursers this bird is said to frequent thin scrub or deciduous hush-jungle rather than entirely open plains.

All that is known about its breeding is a note by a writer in 'The Asian' newspaper (I unfortunately have not got the date) about 1895, describing the finding of the eggs on the bare ground in thin scrub-jungle. The eggs are described as having a bright yellow ground-colour almost obliterated with black scrawls, patches and spots—that is to say, exactly like those of the Indian Courser. They were said to have been laid on the bare ground, two in number, quite unconcealed.

The description, it may be noted, makes the eggs out to be very like the known eggs of an African species.

Glareola pratincola.**THE COLLARED PRATINCOLE.**(2054) **Glareola pratincola pratincola** (Linn.).**THE COLLARED PRATINCOLE.***Glareola pratincola pratincola*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 89.

Within Indian limits this Pratincole breeds in Sind, on the Mekran coast and possibly in Rajputana. Outside India it is found over South Europe, Central and West Asia.

The breeding grounds selected by this Pratincole are almost invariably dark-coloured waste lands, the dark mud, caked and burnt by the sun, round lakes and swamps, or ploughed and fallow fields. In the majority of cases the ground is without vegetation of any kind, even withered grass or stunted scrub and bushes, but in some instances they breed in fields of short stubble.

Ludlow sent me a very fine series of eggs from the Sanmeani swamps on the Mekran coast, where these Coursers were breeding with many other birds in 1915, together with other eggs which he obtained near Jangshahi in 1916. These birds were all breeding on the shores of the lakes and swamps, where the receding water had left them to dry and cake under the sun and where there was no vegetation except a few withered rushes. The ground in fact was exactly similar to other breeding places in Mesopotamia, where many nests in colonies were found by Pitman, Cox, Cheesman and others.

Ticehurst (Ibis, 1923, p. 650) gives an excellent account of one of the breeding places in Sind :—"The site of the nesting ground is the drying edges of the Halijer jheel, which at this time of year is much shrunken in size; the whole area is covered with the foot-prints of camels, buffaloes and donkeys; it is these hoof-marks which the Pratincoles adopt as sites for their nests. About 50 pairs were in the largest colony, well scattered over a large area. On June 2 when I visited this colony, very few had any interests in nest or chick; nearly all were congregated together at the waters' edge, and I could only count three young birds, so evidently the mortality is high, and due to various causes; in the first place I think a good many eggs are addled by heat; a fair number must be trodden on by animals; while Kites, Crows, Foxes, Jackals and Cats certainly take what they can find. So far as I observed, little incubation was done by day, and I found nests by marking where the birds settled which was close to the nest.

"The colony found by Doig was a larger one, the birds nesting in company with the Eastern Pratincole (*g. v.*), and the nests were scraped out by the birds in a salt plain, generally where the soil had been loosened by the rooting of wild pigs. He says three eggs is the normal number; Mr. Ludlow and myself never found more than two."

The breeding season is from the end of March to June. Ludlow obtained eggs at Jangshahi in March, April and May, and at Sanmeani in May. In Mesopotamia Cheesman obtained them late in June when the heat must have been really terrible.

The usual full clutch is two, but three are not exceptional, and I have seen several, among them one taken at Sanmeani.

The eggs are very like those of the Indian Courser and are quite indistinguishable in shape, texture or size, but as a series are much less richly coloured, the ground-colour being paler and tinged with grey or yellowish-stone rather than with yellow or buff. The markings consist of numerous spots and blotches of black, with secondary similar markings of grey. Occasionally one sees scribbles mixed with the blotches, but eggs marked thus are quite exceptional. In a few eggs the blotches are very large, in a few all minute, while in others they become smears or clouds.

A curious pair taken by Ludlow have a faint green tinge in the ground-colour, resembling exactly a clutch of three taken in Spain.

Forty eggs taken in India average 30.5×23.4 mm.: maxima 31.6×23.1 and 30.7×24.2 mm.; minima 29.2×24.0 and 30.0×22.4 mm.

The male assists in incubation, but both he and his mate during the hotter hours of the day generally sit beside the nest, merely stretching one wing over the eggs or chicks to keep off the great heat of the sun. Doig observed this action in Sind, but thought it was a threatening gesture. It may be this also, but I have observed the same posture adopted by other birds who deposit their eggs in nests or scrapes unshielded from the sun.

The colonies in which these birds breed are sometimes very large. Doig collected fifty eggs from one colony in Sind, and this although many birds had already hatched. This breeding place covered some 15 acres, and the nests were much scattered.

Glareola maldivarum.

THE LARGE INDIAN PRATINCOLE.

(2055) *Glareola maldivarum maldivarum* Forster.

THE LARGE INDIAN PRATINCOLE OR SWALLOW-POVER.

Glareola maldivarum maldivarum, Fauna B. I., Birds, 2nd ed. vol. vi, p. 90.

This Pratincole has an enormous range, being found in Ceylon, all over India and Burma, while outside India it ranges through the Indo-Chinese countries to Eastern Siberia and through the Malay States and Archipelago to, but not including, Java.

In its breeding habits this Pratincole differs very little from the preceding bird and, indeed, in Sind breeds in company with it.

Its favourite breeding grounds are, however, rice-fields in which the stubble has been burnt off or stretches of grass country of which the grass has been burnt. In Cachar, Sylhet, Lakhimpur and Kamroop I found small colonies breeding and, in almost every instance, they were nesting in such rice-fields or patches of grass. It was most interesting to note how, when one field among many was left unburnt, not a single bird nested in it, whereas when, as sometimes happened, a patch of burnt grass or a burnt stretch of stubble was situated in the middle of grass or stubble which had escaped burning the nest-colony was invariably in the burnt patch. The resemblance between the eggs and the ground littered with chips of black and yellow straw was so close that I have stood over the eggs and failed to see them. In Burma Hopwood, Mackenzie and Cook all found them breeding on the grass-lands after they had been burnt or in the black soil of the banks and islands in muddy creeks where the eggs were almost equally well assimilated to their surroundings.

Usually the colonies are small, perhaps half a dozen to twenty pairs, but occasionally they number forty to sixty. The nests are a considerable distance apart, and in those I have seen it was rare to find two nests within a dozen paces of one another. One little colony of eight pairs, breeding on a small patch of burnt grass beside a tributary of the Brahmapootra, had all eight nests in the centre of the patch, the whole eight being in a circle of about twenty yards across. No nest is made, and very often there is not even a scrape, the eggs being laid direct on to the bed of burnt rice-straws or upon the blackened earth itself.

The breeding season is from the end of April to the end of June over most of its range. In Pegu Oates found eggs from the 16th April to the 1st May, the latter being much incubated. In the Shan States, and indeed over most of Burma, April seems to be the month in which most eggs are laid, while in Samkok Herbert obtained many eggs in March.

Two or three eggs are laid, two rather more often than three. These cannot be distinguished from those of the Common Collared Pratincole in colour, texture or grain, and the varieties found are the same in both species.

Sixty eggs average 30.8×23.9 mm. : maxima 34.2×25.3 mm. ; minima 28.0×22.5 and 31.4×21.4 mm.

The nests of this bird would be some of the most difficult to find but for the behaviour of the parent birds. The eggs are so like their surroundings that it is impossible to find them by mere search ; the birds, however, sit close and give away the nest by performing antics round it, pretending to be injured or ill, and so distract attention from the eggs. This simulation of injury acted by the Pratincole is certainly not the effect of shock, as the birds will return again and again and go through the same performance in front

of the intruder, always leading away from the nest and not to it, as would certainly sometimes be the case if the action was due to uncontrollable impulses.

Both birds incubate and I have shot both sexes off the eggs. They sit very close, closer apparently than the European bird does, and they generally return very quickly to the nest after being disturbed. This, however, is not always the case, as Hume says that when disturbed the sitting bird flies round one's head for a moment or two and then disappears. The colonies are often easy to locate, the birds flying backward and forward constantly immediately over the ground the nests occupy.

(2056) *Glareola lactea* Temm.

THE SMALL INDIAN PRATINCOLE OR SAND-POVER.

Glareola lactea, Fauna B. I., Birds, 2nd ed. vol. vi, p. 92.

This beautiful little bird is found from Kashmir to Ceylon as a resident breeding species wherever there are big rivers with sandy banks and islands. It is not found West of the Indus but to the East extends over most of Burma.

The present Sand-Plover is just as consistently a frequenter of large rivers with sandy banks and islands as the two preceding birds are of black and burnt lands. They breed invariably on these islands and "churs," and the only exception of which I know is in Ceylon, where Wait found a nest on the sandy shores of a small island in the Minneri tank.

They breed not only on the great rivers of India where they flow more or less placidly in the plains, but often have their nesting places on these same rivers where they debouch from the hills and where the water runs in a mad helter-skelter race past the beach or island where their home is. In Northern Assam I have found colonies on streams well inside the hills, but never where these dwindle away to almost nothing in the dry weather. On the Pobha, Subansiri, Brahmapootra and its tributaries they are to be met with all along their courses so far as these remain rivers with a wide stream forming islands and beaches as soon as the flood-waters recede in January onwards. Over the greater part of India they are said to prefer banks and islands of sand, but in Assam, as well as in some other places, the colonies often breed on beds of small shingle, while on the Subansiri I found a colony nesting in among small and large stones interspersed with huge boulders.

As a rule the birds select the higher sand-ridges for their nests, but often, also, breed right down to the water's edge. On many rivers the floods bring down much débris and make a line of it along the shores like the high-tide line of the sea-shore, but the birds never

breed on this and, if they seek any cover at all, it is only occasionally the thin withered grass or tufts of *Equisetum* which grow on all the sand-banks after the rivers subside. Most nests are placed quite in the open and consist of a scrape about 3 inches across and an inch or a little more deep. Often there is no hollow, and I have found eggs prevented from rolling down the beach only by the tiny furrows left by the falling water. Where the sand is smooth I think there is always a scrape of some kind and, where shingle or stone beaches are frequented, scrapes among these are made from which uncomfortable stones have been removed by the birds.

The breeding season varies according to the usual time of flooding in the river occupied; the scrapes have to be made and the eggs laid and hatched before the rains start or the snow-water of the hills above begins to come down. Generally speaking February, March and April are the breeding months, but the birds are so often washed out by untimely floods that second and even third layings are frequent, such as I have often seen in June.

The number of eggs laid varies much in different districts and even in different colonies in the same area. In Kashmir and North-West India two is the normal clutch, with three quite common; in Burma and Eastern India three is most usual and two exceptional; while in Assam four is normal but, even there, in certain colonies one never finds more than three eggs in a nest and often two only. In Siam Herbert found threes and occasional twos laid.

As we might expect of birds who lay always in sand or among pale sandy-coloured stones or shingles, the eggs are very similar to the sand on which they lie. The ground-colour in most cases is a pale sandy buff or sandy grey, a few eggs have the faintest tinge of olive-green or pink, while still fewer, perhaps one clutch in fifty or a hundred, have the ground a pale brick-red or warm reddish-buff. The markings consist of small primary spots and blotches of light grey-brown or reddish-brown, with secondary blotches of lavender or neutral tint. They are scattered freely, but seldom densely, over the whole surface, often being thicker at the larger end than elsewhere. Occasionally the blotches are larger, and in some eggs give the appearance of mottling, in none are they really bold or in contrast to the ground.

In shape the eggs are broad ovals, very little compressed at the smaller end; the texture is not fine for the size of the egg, nor is it very close, and the shell is fragile; the surface is smooth but glossless.

Two hundred eggs average 25.9×20.5 mm. ; maxima 29.2×21.0 and 28.5×22.0 mm. ; minima 23.9×19.9 and 25.7×19.0 mm.

Both sexes incubate, and incubation seems to take twelve or fourteen days, probably depending a great deal on the weather.

The birds often breed in company with Terns and Plovers of various sorts, though they generally keep to their own particular little patch of sand-bank. The colonies are sometimes very large,

and I have seen several which contained between 200 and 500 pairs. Others may be somewhat smaller, and now and then one sees little colonies of only a dozen or so pairs, but this is the exception.

As soon as the eggs are laid the birds sit fairly close and betray great excitement as one walks among their nests, a matter of some difficulty, as I have seen as many as a dozen nests in a space certainly not exceeding four square yards. They stick to their breeding sites with great tenacity, and I have seen a colony twice flooded out, once early in April when there was an unusually hot period and the snows melted, again in May in an early flood, and yet they all laid once more in June when they were certainly doomed to be flooded out again. In this colony, one of some forty or fifty pairs, every scrape contained four eggs each when I first visited it; so in this year, 1905, every bird must have lost twelve eggs.

Family DROMADIDÆ.

(CRAB-POVERS.)

(2057) *Dromas ardeola* Paykull.

THE CRAB-POVER.

Dromas ardeola, Fauna B. I., Birds, 2nd ed. vol. vi, p. 94.

This extraordinary bird breeds in the islands in the Southern part of the Red Sea, down the Somali coast, in the Persian Gulf islands and again in Ceylon and the Laccadives. It has also been discovered breeding on Oyster Island off the coast of Burma, and may eventually be found to breed in many other islands.

Mr. T. R. Finney gave such a good account of the nesting of the Crab-Plover (Journ. Bomb. Nat. Hist. Soc. vol. viii, pp. 320-3, 1893) that it leaves little more to be said:—"On the 29th May, 1893, I landed on the island of Sad-ad-din, a reef-island about 5 miles from the town of Zaila, on the Somali coast and, with my friend Captain E. R. Shopland, commenced to search the island for eggs, as we had heard that great numbers of sea-birds bred there every year. While we were crossing the level and open plains, we saw at the North-East end of the island a sand-hill about half a mile long and raised above the level about six or eight feet. We saw on this hill a great number of white birds and a number of sea-gulls with them. As we approached we saw that they were a species of plover, and from their consternation we knew they must be breeding. The gulls flew away and left the plovers to their difficulties as we approached. When we reached the sand-hill to our disappointment we could find no trace of a nest. Yet the birds,

some hundreds of them, seemed greatly disturbed, and kept flying round calling loudly to their mates. While the flock was at some little distance solitary birds suddenly began to start up in the most unaccountable manner, as the little vegetation covering the sand-hills was far too low and scanty to have hidden these white birds from view. We then found that they came from holes in the ground. The mouths of these holes were for the most part hidden under the overhanging and spreading vegetation, which looked like heather, but was, of course, not heather. This part of the sand-hill presented the appearance of a rabbit warren, and was tunnelled all over with holes about 7 or 8 inches in diameter, which extended horizontally about six or eight feet. The holes, which were on the top of the sand-hills, went down vertically one or two feet, then turned at right angles to a horizontal direction. The roof of these tunnels was formed by the matted sea-weed covered with sand and low spreading vegetation. Underneath this matted sea-weed the sand had been scraped out by the birds. I think their holes must be used from year to year, and only need a little clearing out at the mouth or perhaps digging out for a few inches past the last year's nest. We did not open out one hole less than four feet in length, and some went to six or eight feet and always in a straight line. Some of the tunnels entered the hill from the sea-face side, but by far the larger number from the top or from the landward side and at every conceivable angle. In many cases the tunnels crossed each other, but they never curved except when they were at the top of the hill, and then only close to the entrance from a vertical to a horizontal direction. At the end of each tunnel one egg was found. Of three dozen eggs taken one-third were hard-set, one-third half-set, and the rest quite fresh."

Von Heuglin, who first found the nests, Huskisson and Nash, who took many eggs for Hume at Montafie Island and Allah Islands, Cunningham, who obtained a series of eggs from islands near Fao, and Sir Percy Cox and Major Cheesman, who found a very large colony, about 400 pairs, breeding on Buna Island and a smaller on Dana, confirm Finney's account in every detail. Nurse also found what he calls "an immense colony" breeding on an island near Zaila.

In the Persian Gulf its breeding habits seem to be the same as elsewhere, but it does not dig so deep a hole, generally about 4 feet, while Cox and Cheesman say that occasionally it lays its egg in a natural hole or in a hollow under boulders.

The breeding season is apparently from early May to the first week in June, but in Ceylon it may lay later, as Anderson found eggs in late June at Adam's Bridge, and Parker, visiting the same place in June, only found one hole and no eggs laid, but later an overseer sent by him found seventeen nests in one bank, all with young.

The single egg laid is pure white, with a very smooth close texture, but not particularly hard and not glossy, while in shape they are long ovals, sometimes decidedly pointed at the smaller end.

Thirty-six eggs average 65.4×45.9 mm. : maxima 67.4×45.0 and 67.0×47.5 mm. ; minima 61.0×46.2 and 63.5×44.3 mm.

The birds sit very close, and Cumming says that they pecked at the hands of the men and resisted attempts to drag them out of their holes.

Family LARIDÆ.

(GULLS.)

(2062) *Larus brunnicephalus* Jerdon.

THE BROWN-HEADED GULL.

Larus brunnicephalus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 103.

This is a Central Asian Gull, breeding in Turkestan and the Himalayas where there are suitable lakes, as in Tibet and Ladak, at great elevations over 12,000 feet.

Steen was, I believe, the first to take the eggs of this Gull, finding them on the Hramtso Lake in the second week in June. Kennedy and Macgregor also received a few eggs from Tibetans which they sent me, these also being from the same lake.

In 1919 and 1920 I sent a party of Tibetans to Hramtso especially to collect these eggs, but in the first year they reported birds in numbers but no eggs and, after waiting a couple of days, they returned without any eggs. In 1920 the same men went up on the 1st July, but this time all the eggs were said to be hatched or on the point of hatching and impossible to blow. In 1921 the men refused to go, but in 1922 some of those who had previously gone agreed to go in the second week of June, and this time found the Gulls laying everywhere in very great numbers. Mr. Macdonald, who arranged this matter for me, sent me two skins with about forty beautiful clutches of eggs, and the following summary of what the men told him concerning the breeding of these birds. This is, of course, only what *they* said, but the whole of their story is confirmed by what other reliable collectors have reported and by what both Steen and Kennedy had told me personally.

The men arrived at Hramtso about the 10th June, and found some 300 or 400 pairs of birds breeding, but the nests were either empty or contained one or two eggs only. By the 14th many nests held three eggs, and the men collected and cleaned about forty clutches of eggs between the 10th and 18th, eating more than twice as many as they cleaned. The nests were placed both upon small islands in the lake and on the shores all round ; those on the wet swampy islands were big well-made nests of rushes and weeds, while those made on the dry mud of the shores were, in Mr. Macdonald's words, "holes dug in the ground by the birds themselves and with a small

attempt at lining with leaves etc." The islands seem to have been very small, probably only mud and weed raised a little above the water round the shores, and there were only one or two nests on each; on the shores, however, the birds bred quite close together, though everywhere, even when the men left, some birds had not then laid. Most of the clutches were of three eggs, but some of the twos sent me looked as if incubation had begun. Some of the Gulls which were nesting in a marsh close to one side of the lake had made nests as big as those on the islands, but from what I gathered the men had rather shirked working this marsh, which was deep in some places.

It breeds in Ladak but no one seems to have visited their breeding lakes at quite the right time. Osmaston (Ibis, 1923, p. 714) says that at the Tso Kar Lake, 15,000 feet, and at Tso Moriri there were large colonies of these Gulls, but that they had not commenced to breed on the 22nd June. A solitary pair was also seen on the Pangong Lake and a single bird on the Indus or Spituk on the 17th May. This was at an elevation of 10,500 feet, and the bird was probably travelling North.

In Tibet Ludlow notes (Ibis, 1928, p. 225) that it arrives in March and leaves in October, and is very common in Summer on the Dochen and Kala Lakes. He adds:—"I have no first-hand knowledge of the nidification of this Gull, and the only eggs I received were obtained for me by Tibetans. It would appear, however, from their accounts that these birds lay in May on islands in the lakes, depositing their eggs, two in number, in mere scrapes in the ground."

The breeding season, judging from the above notes, seems to be June and early July and, possibly in some very advanced seasons, in May also.

The most usual number of eggs in a clutch is three, but two only are also often laid.

In shape the eggs are long ovals, decidedly smaller at one end than the other, but never really pointed. The texture is rather coarse and not very close, so that the surface is not very smooth and is never glossy.

In colour the ground varies from a white with the faintest tinge of blue, green or creamy to a fairly warm creamy buff or, exceptionally, a pale dull reddish-buff. The markings consist of large blotches and spots, with occasionally a few hieroglyphics of vandyke-brown, blackish-brown or reddish-brown scattered over the white surface and rather more freely at the larger end than elsewhere. The secondary markings are similar but of grey and pale sienna-brown, and generally less numerous than the primary. The range of variation is less than in many other Gulls' eggs and cannot compare with the variation in those of our European Black-headed Gull. As a whole, also, they are among the least handsome of Gulls' eggs.

One hundred eggs measured by myself average 61.3×42.6 mm.: maxima 66.9×41.4 and 65.5×45.6 mm.; minima 57.1×42.7 and 65.0×39.1 mm.

Ludlow gives the maxima of fourteen eggs measured by him as 68.75×41.0 and 60.0×42.5 mm.; minima 55.5×41.0 and 62.0×37.0 mm.

(2063) *Larus hemprichii* Bruch.

THE SOOTY GULL.

Larus hemprichii, Fauna B. I., Birds, 2nd ed. vol. vi, p. 104.

The Sooty Gull breeds on islands off the coasts of Mekran and Somaliland and in the Red Sea and Southern Persian Gulf.

Butler obtained a fine series of the eggs of this Gull from the island of Astola, off the Mekran coast, on the 6th August, 1877, from some boatmen he sent to collect them. According to the boatmen the eggs were laid in nests on low hushes (*Salsola* sp.). They told him that "The nests, which are about the size of crows', are loose and ragged in construction, composed of the twigs of the low salt-bushes in which they were built, and always carefully concealed from view.

"I heard subsequently from other natives that the eggs were sometimes laid on rocks, but always carefully hidden and consequently difficult to find.

"The eggs, according to the boatmen, number from one to three."

Sir Percy Cox, quoted by Ticehurst, found the nest to be "a slight depression with a few bents of grass and *Salsola*-scrub situated at the side of and sheltered by a tuft of *Salsola*," so Ticehurst rules out of court the nest made on bushes. Probably, however, both kinds of nest are made, as Pitman found nests on *Salsola*-bushes on an island in the Persian Gulf, and I have a note sent me with some eggs, taken in July 1894 in the island of Zaila, to the effect that "The birds are said to make substantial nests of weeds, grass, and twigs on salt-bushes." Then, on the other hand, Archer obtained the eggs of this Gull in an island off the Somali coast which "were laid on rocks with little or no nest, and were quite conspicuous and in no way concealed, as was claimed by Butler's boatmen."

It will probably be found that the Sooty Gull does exactly what our English Black-headed Gull does, breeding sometimes on sand or rocks with no nest, very little nest or a good nest, and sometimes on low bushes, when it perforce has to make a nest.

The breeding season is from the end of June to the end of August. Cox obtained them in Zaila in the same month and Archer off the Somali coast in July, but Butler in Astola, Miss Jackson in Kiamboni and Pitman in the Persian Gulf all found them in August.

The number of eggs laid is probably two or three, but nearly everyone seems to have simply collected so many *en masse* without bothering about keeping them in clutches. Archer found two eggs in a clutch in the island off Somaliland and Pitman took two in the Persian Gulf, and Miss Jackson ones, twos and threes in Kiamboni.

The eggs are not handsome. The ground-colour is a dull pale yellow-stone, often tinged with grey, while occasionally it might

almost be called a pale purple-grey or pale brown. The marks consist of small blotches and spots of brown of various shades and secondary blotches of grey and inky purple. In a few eggs the markings are entirely scrawls and long twisted lines scattered over the whole surface, but in one egg in my collection they are confined almost entirely to a cap at the large end.

Twenty-four eggs average 56.8×40.9 mm.: maxima 66.2×41.2 and 62.1×45.0 mm.; minima 54.0×40.0 and 56.0×39.9 mm.

There seems to be nothing further recorded about its habits beyond the fact that it breeds in very large colonies.

(2064) *Larus genei* Brême.

THE SLENDER-BILLED GULL.

Larus genei, Fauna B. I., Birds, 2nd ed. vol. vi, p. 106.

Within our limits this Gull only breeds in Mekran and in islands off the coast and just outside at Sonmeani in Las Bela, Baluchistan. It breeds freely on many islands in the Persian Gulf and Red Sea, in islands off the coast of Senegambia and also in the Caspian and Mediterranean.

Mr. Nash first obtained their eggs on the Morpatty swamp, eight miles from Ormarra in Mekran, and gives a very good description of the breeding place (Hume's 'Nests and Eggs,' vol. iii, p. 294). "The place consists of a creek running out of the sea inland, and terminating in flat marshy ground some 9 or 10 miles in extent, with scarcely a particle of vegetation except a few low bushes dotted about in one or two places. After the rains it looks like an immense river, but towards the hot weather as the water dries up small mud islands from 50 to 100 yards in diameter become visible from day to day as the water goes down, and on these islands I found a few nests of the present species.

"On one island were found two nests only a few yards apart, each containing three eggs, and on another two or three more nests containing from one to three eggs each. All the eggs were quite fresh, and three seemed to be the usual number. The nest consisted of a substantial pad of seaweed about 8 inches in diameter, raised a few inches above the ground, and very solidly constructed."

Later Ludlow's collector found them breeding in the Sonmeani swamp, and confirms the above description.

In a letter accompanying a series of the eggs which Ludlow sent me he writes:—"The bird was breeding with *Sterna anglica* and *H. caspia*. He brought in about 60 eggs of this species later, taken about 8. 6. 16. The nest was raised above the surface of the ground and was of a different type to that of the other two terns. My man did not obtain the eggs of this bird last year, and the explanation may be as follows. *S. gelastes* (= *genei*) loves salt water. Last year there was much water in the jheel and it was

quite fresh. This year there has been no rain, the jheel has sunk enormously, and the water has become very brackish indeed."

Cox, Cheesman and Pitman all found it breeding in great numbers on islands, such as Shilak, Iskandarysk and Warba, in the Persian Gulf, but here most of the clutches were of two only.

The breeding season in the Persian Gulf is from the end of May to the end of June. The earliest date I have recorded is for some eggs taken by Cox on Warba and Bubijan Islands on the 20th May. It is curious that in the grilling heat of the Red Sea and Persian Gulf, June, the hottest month of the year, should be the favourite month, while in Spain the birds breed in the end of April and early May and in Eastern Europe and the Caspian principally in May.

The eggs in a clutch number two or three. In appearance they are very like pale small eggs of the Brown-headed Gull. The ground is white, seldom if ever pure, but tinted with pink, creamy, yellow or buff, never of any warmth. The primary markings are blotches varying considerably in size, but generally rather large, though occasionally quite small, of dark brown or blackish-brown. The secondary blotches are grey or pale to dark inky, both these and the primary ones being fairly dense at the larger end and scanty elsewhere. In some eggs there are, in addition to the spots and blotches, a few short streaks and twisted lines of the same colour. One unusual pair has a very pale salmon ground sparsely dotted with brown and lavender equally over the whole surface.

The texture is coarse, the surface smooth but never more than faintly glossy. In shape the eggs vary between broad and moderate ovals, occasionally rather pointed.

Two hundred eggs average 55.75×38.65 mm. : maxima 62.4×42.0 and 58.0×43.1 mm. ; minima 51.5×39.3 and 50.1×36.8 mm.

Family STERNIDÆ.

(TERNs.)

Chlidonias hybrida * Pallas.

THE WHISKERED TERN.

(2067) *Chlidonias hybrida indica* (Stevens).

THE INDIAN WHISKERED TERN.

Chlidonias leucopareia indica, Fauna B. I., Birds, 2nd ed. vol. vi, p. 111.

This little Tern is found all over India, commonly in the North, less so in the South, and not in Ceylon. East it occurs in Bengal

* It is now accepted that Pallas's *Zoog. Russo-Asiat.* was published in 1811, and so antedates Temminck's *Mén. d'Orn.* 1820 and, accordingly, we revert to *hybrida* in place of *leucopareia*.

and Bihar, but is replaced in Assam by the Eastern race *javanica*. Outside India the birds from Mesopotamia seem to be nearer the Indian than the European bird.

This little Tern breeds in vast numbers wherever there are suitable swamps with a certain amount of open water and lakes. Captain Pitman found huge colonies breeding on the Euphrates at Maseyib. It occurs in equally great numbers on the lakes in Kashmir and in lesser numbers on the lakes of the Punjab, North-West and United Provinces and, in much smaller numbers, in Bengal, where I believe the only record is that of a large colony seen by my father and myself in the great lakes and swamps of Eastern Khulna. As regards these latter no specimens were shot, and it is possible that the birds belonged to *javanica* rather than *hybrida*, as there seems to be a big break between this colony and the nearest on the West, in Oude, where Gill took eggs recently, while Anderson and others have taken them in Fyzabad.

In Kashmir so many have taken their eggs and nests that it is difficult to choose between the many descriptions given. Hume says, writing of the Achulda Jheel :—"In the centre of the Jheel where the water was deepest and no rice or rush grew, but where the lake was paved with lotus- and lily-leaves, a small colony of these birds had established itself. On the broad leaves of the lotus they had built loose slight nests of rice- and rush-stems, and in these we found three eggs. There were not less than twelve or more than twenty couples."

Anderson says "a vast assemblage of these Terns were constructing floating nests, bringing for the purpose long wire-like weeds, some of them two feet in length. The circumference of some of the nests I measured ranged between $3\frac{1}{2}$ and 4 feet and they were about four inches thick. They were composed entirely of aquatic plants and so interwoven with the growing creepers that it was impossible to remove them without cutting at the foundation of the structure."

Betham adds a good deal to this in his notes to me. He remarks :—"These birds breed in small colonies, rarely even one finds a nest all alone. The total number of birds breeding in these lakes must be enormous, but the colonies are never very big. The nests are very fragile and very badly put together from the human point of view, yet nothing could be better adapted to its needs. The nests may measure between one foot and eighteen inches across by not more than four inches deep, the materials sticking out in all directions, and they are built on the floating lotus-leaves or among the Singhara or water-nut plants, the plants and the nests attached to one another and floating loosely so that it can rise or fall in safety with the rise and fall of the water. Nests are sometimes close together, but as a rule there is a yard or two or more between the nests. The eggs number two or three, generally two."

The birds breed in May and June in Kashmir, but in the plains

they do not commence to breed until after the rains break, and most eggs are laid in July and August, while in Fyzabad, where Eates found "a large colony breeding in company with little Grebes," the birds had fresh eggs in September.

The clutch numbers two or three and very rarely four.

In shape the eggs are short to moderate ovals, often considerably pointed at the smaller end. The texture is fine and fairly close, but the surface is normally glossless and the shell fragile.

The colour varies almost as greatly as it does in the eggs of the Common Tern, but the eggs in each clutch agree fairly well with one another and do not contrast as they so often do in clutches of that bird. The most usual ground-colours are a pale yellow-stone, greenish-stone, pale buff or pale brown ranging to a bright green or a deep brown. The markings vary just as greatly; in some they consist of large blotches and spots of deep red-brown to black, in others they may be tiny specks of the same. In some they are scanty and may form rings or caps at the larger end, in others they are profuse over the whole surface. A few eggs have a mottled or clouded appearance, but lines and hieroglyphics are practically never present.

Two hundred eggs average 36.9×27.4 mm. : maxima 40.8×26.4 and 37.0×29.3 mm. ; minima 34.3×27.4 and 35.3×26.0 mm.

(2069) *Chlidonias hybrida javanica* (Horsf.).

THE JAVAN WHISKERED TERN.

Chlidonias leucopareia javanica, Fauna B. I., Birds, 2nd ed. vol. vi, p. 113.
Chlidonias leucopareia teggeti, ibid. vol. viii, p. 499.

A fine series of skins sent me from Ceylon shows that the Ceylon form, though darker than the Indian, cannot be separated from the Javan bird.

The range of the Javan Whiskered Tern therefore includes Ceylon and extends from Assam, throughout Burma, the Malay States to Java, Borneo and the Celebes.

I can find nothing on record about these Terns, but in Assam I saw many colonies, and an account of one of these would serve for all.

Outside the station of Silchar and running right up to the houses of some cultivators on the outskirts of the bazaar there is a swamp, shallow in the dry weather, but as much as 10 or 12 feet deep in the centre when the rains are advanced. All round this swamp rice is cultivated, but where it is not sown with rice there is a fringe of rushes and water-grass, thin everywhere, and then a floating mass of lotus-, lily- and other leaves mixed with all kinds of weeds, and with only small patches of clear water here and there.

In 1896 I was riding past this swamp on the 5th June, after there had been unusually heavy rain, and I was surprised to see

Whiskered Terns in very large numbers over the whole area and evidently breeding. On the 6th June I got a dugout, visiting some 300 or 400 nests with eggs, from which I selected a series. In some places the nests were in great numbers, almost touching one another, while in other places they were scattered about far apart. All the nests were of much the same type, just roughly made platforms of rushes and reeds, measuring anything from 1 to 2 feet across, very untidy and very loosely constructed. In most, however, if not in all, the centre of the nest was more substantial and better put together with a mixture of strips of rush-blades and paddy-straw etc., on which the eggs lay. In most cases, also, the nests rested on the floating lotus- and lily-leaves or in others on masses of water-weeds; a few, however, were built in among the growing rushes, and these latter were all drowned out when the water rose, whilst the others rose with it. On the 26th June there must have been at least 1,000 pairs breeding, nesting and laying, including far more than those who had lost their first nests in the flood or whose eggs I had taken, several of these latter having laid again in their old nests.

Normally these birds bred in late June and through July and August but, whenever the rains were exceptionally early and heavy, many of them commenced to breed directly their food-supply was assured.

In 1912 Mr. Mundy kindly visited the swamp in Silchar to report to me. On the 6th June there were a few pairs flitting about the swamp but none breeding. The rains broke on the 16th and the jhil at once began to rise, and on the 26th many birds were making their nests, while on the 17th July there were fresh eggs, half incubated eggs, and many on the point of hatching. In August they were still laying, and by that time the pairs must have numbered 1,500 to 2,000. Great quantities were taken and eaten by the natives, but the birds never deserted, and laid again and again in the same nests.

We were able to test the period of incubation very easily here, unless the villagers stole the eggs, and we found that it took fourteen days and occasionally fifteen. Both birds take a share in building the nests and both incubate but, unless it is too hot or is raining, the eggs are left uncovered for much of the day.

The nesting season has already been referred to, and the number of eggs in a clutch is usually three, but often two only, and not very rarely four.

The eggs are of course quite indistinguishable from those of the preceding bird but, perhaps only because I have examined so many hundreds of nests, unusual variations seem to be met with rather more frequently. Among these may be mentioned a clutch which is almost sage-green, another practically white and another pale stone-buff with broad rings of coalesced black blotches round the larger end.

Two hundred eggs average 37.0×27.2 mm. : maxima 40.3×28.1 and 39.0×29.1 mm. ; minima 35.0×28.0 and 36.0×26.2 mm.

Although the swamp referred to above was to all intents and purposes in a town, yet the birds also breed in swamps and flood-land far from any habitations or cultivation, and one colony I knew was in an endless swamp at the foot of the Khasia Hills in the Sylhet district. This also was a huge colony of hundreds of pairs, but occasionally one sees breeding colonies of as few as twenty pairs. Such a colony bred on quite a small lotus- and reed-covered tank on the outskirts of a small village in Cachar, the birds being exceptionally tame as their nests were not interfered with.

Hydroprogne caspia.

THE CASPIAN TERN.

(2071) *Hydroprogne caspia caspia* (Pallas).

THE CASPIAN TERN.

Hydroprogne caspia caspia, Fauna B. I., Birds, 2nd ed. vol. vi, p. 115.

This large Tern breeds only on the Mekran coast and possibly in the islands, as it breeds freely on the islands of the Persian Gulf. Outside our limits it breeds over a very wide area in Europe, North Africa and Western Asia.

Parker first found this bird breeding on Adam's Bridge in Ceylon, and thus describes their nests :—"When examining the banks at Adam's Bridge I came upon a colony of six nests of these fine terns containing 9 eggs. They were shallow hollows scratched in the sand, from 5 to 7 inches wide and one to one and a half inch deep. Two had a partial lining of twigs and a few shells, but the others were without any. The nests were on the highest ridge of the bank, all near together, from one foot to about six feet apart, and not more than a few inches above high-water level."

In Sonmeani Bheel, Las Bela, Ludlow's collector obtained a magnificent series of the eggs of this Tern, from which he sent me a selection with the following note :—"The eggs were taken about 8. 6. 16 while a few had been taken in the middle of May. My man brought me in over 100 eggs of this species a few days ago with the skins of this and other smaller Terns. They breed in the same spot as they did last year along with *Sterna anglica* and other Terns. The eggs were never more than three in a clutch. My man reports that practically all the eggs taken about the 8th June contained embryos in a state of putrefaction, and from the state of the eggs when I received them I should say this was true. He puts it down to the excessive heat which was prevalent at that time." In a

further letter he describes the nests as "comparatively well made of sticks, rushes and weeds placed on the top of the stunted scrub growing all over the swamp, and never placed on the ground like the nests of the Terns."

In the Persian Gulf they breed on many islands in May and June.

The full clutch of eggs is three or two. As a series they do not vary much. The shape varies from broad to long oval, most eggs being moderately long. The texture is coarse but fairly close and the surface is smooth but glossless. The ground varies from pale stone-yellow or stone-grey to a rather dark dull buff, an occasional clutch having a pinky tinge. Dark richly coloured eggs are very exceptional, most being rather pale and dull. The markings consist of primary blotches of deep brown or blackish with secondary blotches of grey. In most eggs the blotches are rather small and are lightly scattered over the whole surface, often slightly more numerous at the larger end. In a few eggs the blotches are larger, richer in tint and more numerous, and in a few eggs the blotches become smudges. An abnormally coloured and beautiful clutch contains eggs which are lavender-white, with a few smudges of lavender and blotches of brown at the larger end.

Thirty Indian eggs average 64.8×46.0 mm. (practically the same size as European eggs): maxima 72.1×44.4 and 63.9×47.0 mm.; minima 60.5×43.8 and 63.1×41.1 mm.

Gelochelidon nilotica.

THE GULL-BILLED TERN.

(2072) *Gelochelidon nilotica nilotica* (Gmelin).

THE EGYPTIAN GULL-BILLED TERN.

Gelochelidon nilotica nilotica, Fauna B. I., Birds, 2nd ed. vol. vi, p. 117.

Legge believed this Tern to breed in the North of Ceylon, where he saw birds in full breeding plumage. In the North-West they breed on some of the larger rivers, while in Sind Ludlow obtained their eggs in the Sonmeani swamps about 50 miles North-West of Karachi. Major Lindsey Smith found many colonies on the Chenab above and below Multan (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 367, 1914), while Pitman, Buchanan, Ratray and Hume have all taken their eggs on the Indus, and H. W. Waite obtained them on the Beas at its junction with the Sutlej (*ibid.* vol. xxv, p. 300, 1917).

They seem to breed only in small colonies; Hume found a single nest with one egg on the 28th April, but this was abnormally early and undoubtedly the birds had not started serious breeding.

Lindsey Smith in letters to me says that the various colonies he found numbered anything from a dozen to twenty pairs, while Waite found a colony of nine nests but says there may have been one or two more which were not noticed. Lindsey Smith gives no description of the nest, but in a letter to me he writes :—"The bank on which I got these was so crowded with eggs and young of *G. lactea*, *Sterna seena*, *S. melanogastra*, *S. minuta* and *Rhyncops albicollis* that in places it was difficult to walk without treading on eggs or young. The next day, the 1st July, the floods came down and drowned out everything. Hume was too early for the eggs of this Tern ; I have seldom found their eggs before the 9th or 10th of May, but the heat at this time of year in an open boat on the river is so great that I am not surprised that their eggs have not been taken before."

Waite says of the nests :—"They were all more or less grouped with those of *Sterna seena*, in the middle and highest portions of the bank, where there were occasional small tufts of grass. In each case the nest consisted of a depression in a tiny mound of sand, which in one or two instances appeared to have been scraped up by the birds. Every nest contained one or two small pieces of stick or other débris for the eggs to rest on except that in one case a little dry grass had been provided instead. This fact alone would have served to distinguish the nests from those of *Sterna seena*, which were invariably bare depressions in the sand. One of the nests contained one egg only, while of the rest three contained three and five two."

The breeding season is May though, as above quoted, Hume obtained one egg on the 28th April and Lindsey Smith others on the 30th June.

The full clutch seems to be indifferently two or three.

The texture is rather coarse but compact and the surface has the typical smooth texture of *Sterna* eggs, though there is no gloss. In shape the eggs vary from broad to moderately long ovals, the latter being sometimes slightly pointed at the smaller end.

The ground varies from pale yellowish or, very rarely, greenish-stone to a rich warm huffy-brown or pure brown. The blotches, usually rather large, are of brown, purple-brown or reddish-brown, sometimes almost black, with secondary ones of grey and lilac. The markings seem to be never either very numerous or very sparse and they are often decidedly denser at the larger end than elsewhere, though they do not form rings or caps.

One hundred Indian eggs average 47.9×34.2 mm. : maxima 51.5×37.0 mm. ; minima 43.5×34.0 and 47.0×32.4 mm.

Thalasseus bergii.**THE LARGE CRESTED TERN.**(2076) **Thalasseus bergii bakeri** Mathews.**THE MEKRAN LARGE CRESTED TERN.***Thalasseus bergii bakeri*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 122.

This race of the Crested Tern breeds on the islands of the Persian Gulf and on Astola, an island off the coast of Mekran, and possibly other islands.

Cheesman and Cox found these birds breeding in huge colonies on Boona and other islands in the Persian Gulf in June, and their notes on the nidification agree with Butler's except that they seem to have never found more than one egg in each nest.

A. E. Butler's description of the breeding of this Tern in Astola Island is very complete. He writes (Hume's 'Nests and Eggs,' vol. iii, p. 297) :—"On the 29th May, 1877, I landed on Astolah Island, an island off the Mekran coast about 24 miles S.W. of Pusnee. On landing on the island I found the plateau covered from one end of the island to the other with *Larus hemprichi*.

"Several groups of the Large Sea-Tern had just commenced to lay. The birds make no nest, neither do they even scratch a nest-hole. The eggs (at that time only one in each nest) are laid on the bare ground in the most open and exposed parts of the island about one foot apart, and when sitting the birds seem to be packed together as close as possible, without perhaps touching each other. There is no difficulty in discovering the eggs, as the birds, often as many as 200 or more in a group, sit close, with quantities of stragglers, probably the cock birds, flying backwards and forwards a few yards above them, the whole keeping up a tremendous clamouring, and when approached they rise reluctantly off their eggs, chattering and screaming loudly. I did not see the first group rise myself and I thought it best to sit down a few yards off and watch the birds return to their eggs. No sooner had I done so than both species (*Sterna bergii* and *Larus hemprichi*) began to descend in dozens on the spot where the eggs (about 30) were laying. In a moment a general fight commenced, and it was at once evident that the eggs belonged to *Sterna bergii* and that the gulls were carrying them off. So I jumped and ran forward yelling like mad, and on reaching the spot found that even in that short time the gulls had destroyed upwards of a dozen. I took the remainder and proceeded in the direction of two more groups, which raised the number to 46. Other groups were collected on the island but had not yet laid. It seems evident that this species lays in groups to protect its eggs from the ravages of the gulls and other birds.

"I received another batch of eggs from the same place on the

19th June. The man who took them said that they were laid in groups as described above, and usually three in each nest, never more.

"I may mention that of the 600 eggs now before me scarcely two are alike, and some beautiful specimens have the ground-colour a rich salmon-fawn, with markings exactly like Arabic characters. In fact so like that some natives when they saw the eggs said that they were covered with Arabic writings."

It may appear cruel and unnecessary to have taken 600 eggs, but what this really means we can gather when Butler tells us that Nash saw a consignment of 7,000 being landed at Ormarra for food.

In later years Butler took more eggs, and I have many in my collection taken by him, yet he never seems to have found more than one or two eggs in a nest.

Cox, when he visited Astola on 30th June, 1910, found thousands of the birds breeding in scattered colonies of fifty to one hundred pairs, and he then found full clutches to consist of one, two or three eggs but the latter must have been rare as there were none in his collection when he gave it to me.

Like so many other Indian Gulls and Terns which are not river breeders and have not to fear floods, the Crested Terns breed during May and June, when the heat on sand and rock is terrific and eggs exposed too long become either "hard boiled" or roast chicken.

The eggs of the Crested Terns of the genus *Thalasseus* are among the most beautiful and varied of all eggs. The ground ranges from white, which is not common, the palest pink, cream or yellow-cream, to a deep salmon, buff or rosy-buff. The markings differ very greatly also, but are nearly always bold, standing out in fine contrast to the ground, not being numerous enough to obliterate the beauty of the ground-colour. In the majority of eggs the primary markings consist of blotches of fair size ranging from brown and chestnut-brown to black, the latter often surrounded by a halo of reddish. The secondary markings are of pale grey, cream-grey or pale reddish, and are nearly always much fewer than the primary. In some eggs the blotches are few, very large and very bold while, on the contrary, small and numerous markings are exceptional. Often instead of blotches the markings consist of lines, long or short, or hieroglyphics, sometimes mixed with blotches, sometimes alone. Some unusual eggs in my own series are (1) deep rosy pink clouded and smeared with purple-black and purple-grey; (2) bright cream with numerous wavy lines of reddish-brown; (3) brown, well covered with small blotches and spots of deep brown and blackish with underlying marks of inky.

One hundred and twenty eggs average 61.7×43.3 mm : maxima 67.5×42.5 and 59.5×45.0 mm.; minima 53.8×42.9 and 65.3×42.0 mm.

Apparently incubation takes about three weeks or twenty-three days.

(2077) *Thalasseus bergii edwardsi* Mathews.

THE CEYLON LARGE CRESTED TERN.

Thalasseus bergii edwardsi, Fauna B. I., Birds, 2nd ed. vol. vi, p. 122.

The range of this bird is rather doubtful and cannot be definitely settled until much more breeding material has been obtained. The type-locality is Ceylon, this Tern undoubtedly breeding there and in the Laccadives. A Crested Tern breeds in the Bay of Bengal, and eggs were taken by Shopland in Oyster Island off the coast of Akyab which are, I believe, of this species. It also breeds in certain islands on the Burmese coast as far as Mergui, but where it meets the Chinese form *cristata* is still uncertain.

Parker found this Tern breeding in June on Adam's Bridge while Nevill, in the same month, obtained eggs from a small rocky islet about 20 miles North of Galle. Hume says that "we saw an enormous flock of it at Pere-Mull-Par in the Laccadive Islands, a small flock at Cherbaniani reef and a single specimen near Bingaroo in the Anicuttee tala."

Wait took six single eggs from nests on a bare flat coral-rock off the coast of Galle on the 30th April and Phillips a big series from an island off Ambulamgoda on the West coast, all his eggs also being singletons. Shopland took the eggs on Oyster Island on 19th May, while Wait and Phillips took them on the Ceylon coast on the 30th April and 5th May respectively.

The eggs are in every respect similar to those of the other races and are equally beautiful and varied.

Twenty eggs average 60.0×42.4 mm. : maxima 64.2×44.2 mm. ; minima 54.9×40.3 mm.

(2078) *Thalasseus bergii cristata* (Stephens).

THE CHINESE LARGE CRESTED TERN.

Thalasseus bergii cristata, Fauna B. I., Birds, 2nd ed. vol. vi, p. 123.

Within our limits this race of the Crested Tern has only occurred as a breeding bird in some of the islands off the Southern coast of Mergui. It is also found on the coasts of China and the Indo-Chinese countries.

A collector whom I sent to Tenasserim to work for me sent me a skin of this Tern with twenty eggs, all of which arrived in small bits except two. He described the island as a small one he visited between King Island and the coast on which "these gulls were simply swarming, the eggs being laid on the bare rock or sand without any attempt at a nest. All the eggs were single ones."

Williamson obtained a series at Hin Chalam, a rock off Koli Chuan in the Gulf of Siam, and Herbert took others on Koh Samui

off the coast of Bandon. Both say that the eggs were all singles, but they were all quite fresh, so others might have been laid later, and Delacour, who found this Tern breeding on the Paracel Islands, says that they sometimes lay three in a clutch. All describe the nests as merely scrapes in the sand or say that in many cases the eggs are laid on the bare sand or rock without any nest or even a hollow scraped in the former.

The breeding season seems to be May and June.

The beautiful series collected by Williamson contains most of the varieties shown among the eggs of the other species and races of Crested Terns.

Thirty-two eggs average only 58.7×41.8 mm. : maxima 62.9×42.2 and 57.0×43.2 mm. ; minima 54.1×43.2 and 59.0×40.0 mm.

Thalasseus bengalensis.

THE LESSER CRESTED TERN.

(2079) *Thalasseus bengalensis bengalensis* (Lesson).

THE INDIAN LESSER CRESTED TERN.

Thalasseus bengalensis bengalensis, Fauas B. L., Birds, 2nd ed. vol. vi, p. 124.

The smaller form of Crested Tern breeds in the islands of the Persian Gulf.

Col. E. A. Butler obtained a long series of the eggs of this Tern on an island close to the Island of Arabi in the Persian Gulf in 1878, and on Arabi itself in 1879 on the 19th June. In 1894 Cox obtained eggs at Zaila in July and in 1921-2 Cox and Cheesman took others on Buna, Warba and other islands in the Persian Gulf in the last week of May.

There has been nothing recorded describing the nidification of this Crested Tern, but apparently its habits are similar to those of the preceding species. It lays either one or two eggs on the bare sand or on rocks, sometimes scratching a hollow in the former for the reception of the eggs, at other times failing to do even this, and never making any attempt at a nest.

The eggs are similar to those of *Sterna bergii* but not nearly so handsome as a series. Eggs with pink, salmon or buff ground are quite unusual, nor are the eggs ever beautifully scrolled as they so often are in the larger species.

One hundred eggs average 53.4×36.4 mm. : maxima 62.7×33.1 and 56.8×38.2 mm. ; minima 47.5×34.6 and 49.8×33.0 mm.

(2080) *Sterna aurantia* Gray. :

THE INDIAN RIVER-TERN.

Sterna aurantia, Fauna B. I., Birds, 2nd ed. vol. vi, p. 125.

Wherever there are large rivers with suitable breeding banks and islands there this River-Tern will be found throughout India and Burma and thence throughout the Malay States to Singapore. In Northern India colonies may be seen every few miles or less on all the larger rivers, but in the South they are not nearly so common and the colonies are few and far between, while I have no records from the South of Madras, Mysore or Travancore.

They select in preference wide rivers of clear-running water where in the dry season large islands and banks of sand are to be found all along their courses. They breed in the deltas also, but never on mud, though I have seen colonies on the Megna, Hooghli, Ganges and Brahmapootra on isolated sand-banks and islands even in the areas where mud predominates and shows in patches at the edge of the shores even of the selected islands themselves. In tidal creeks and on the many entirely mud-covered islands they never breed; nor will they be found in the hill-streams within the hills, though a few small colonies breed on the Suhansiri and smaller streams running into the Brahmapootra, and big colonies may be seen on the Dibong, Dihong and Brahmapootra a good many miles inside the hills, where these rivers are still of considerable width and volume. A large colony, some two hundred pairs, and a second of about half that size breed on the Pobha River fully 10 miles above where it debouches from the hills. Here the river varies from 100 to 500 or 600 yards across, cut up into shallow rushing streams, with broad islands of shingle and sand and here and there deep wide pools in which many a monster mahseer sleeps and feeds his time away. On the shingle many birds breed, but the River-Tern keeps entirely to sand, and in it scratches an unusually deep scrape for her eggs, the scrape being used quite unlined.

They seem to love breeding with other birds, and I have seen them breeding on the larger sand-islands of the Brahmapootra, Megna and Ganges together with the Black-bellied Tern, Ternlets, Swallow-Plover and an odd pair or two of Spur-winged Plover, Great Stone-Plover etc. As a rule each Tern keeps to its own area and, sometimes, on big islands two or even three colonies may be found, each with a well-defined boundary and always on sand. The Ternlets scattered here and there, the Swallow-Plovers and the other Plovers may be found breeding more or less indifferently in shingle or sand, but the River-Terns always in the latter. Hume also refers to this "community" nesting, and says:—"It is not among rocks or rocky reefs, where so many of the Great Stone-Plovers and the Lapwings are nesting, that we found the eggs, but on bare low spots of sand from 2 or 3 feet above the present river-level. On one occasion we

found a solitary nest, but usually several pretty near together. On one bank, within a compass of 100 yards, we found there the Indian Skimmer, the Black-bellied Tern and the Small Swallow-Plover all breeding, each species, however, keeping pretty much to its own locality. The vigorous manner in which these Terns attack and chase away Crows, Kites, and similar would-be robbers from the immediate neighbourhood of their nests is very noticeable. To me they seemed to show more solicitude for their eggs than any of the other species breeding near them. It is impossible to doubt when they have eggs anywhere near; the way they flash backwards and forwards and wheel round and round overhead, incessantly repeating their shrill plaintive cry, at once reveals the existence of the treasures they are so anxious to preserve.

"As a rule one does not find numerous pairs of this species breeding on the same sand-bank, and they almost always keep a good many yards apart from each other and other species."

In some respects my experience does not agree altogether with Hume's. In the first place, the behaviour of all the Terns which breed on the river-banks and islands seems to be much the same, and it may be added that all of them, not content with wheeling about over their breeding ground, often come to meet the intruder, in boat or on foot, who comes to visit them. Certainly the colonies in most instances keep to themselves and do not mix with others, but I have seen half-a-dozen nests within a foot or two of each other and more than two hundred nests on quite a small patch of sand-bank. Again, small colonies hardly seem to be the rule; I have seen several of over two hundred pairs and one or two of upwards of four hundred.

Eates speaks of "colonies of several hundreds on the river Gogra near Fyzabad"; Gill found a colony "of about 300 pairs on a small sand-island in the Ganges about 200 yards long by about 50 wide." So also in Burma Hopwood found "immense" colonies.

Reference must be made to Oates's idea that they sometimes breed in Pegu "in paddy-fields and waste ground covered with short grass." This, of course, is a mistake and there is not the slightest evidence in support of his belief.

The principal breeding season is March and April, but I have taken eggs in February, especially in the rivers near the hills, which are subject to early floods from melting snow. In the North-West April is the favourite month for eggs, while Pitman obtained them in the Sntlej in late May, and Hopwood and Mackenzie also took them at that time on the Upper Chindwin, though most were hatching at the end of April.

The normal clutch of eggs is three, both two and four being sometimes incubated.

In shape the eggs are very constant, broad ovals very little smaller at one end than the other.

The colour varies greatly. The majority of eggs are a pale buff-stone fairly freely marked with blotches and spots of brown,

red-brown, blackish or, rarely, chestnut-brown, the secondary blotches being of grey or inky grey. In most eggs the markings are numerous but seldom dense, and show up distinctly against the ground, being more plentiful at the larger end. Some eggs have a few lines or hieroglyphics scattered about, and still fewer have all the markings of this character.

Other eggs have the ground-colour pale grey-green or yellow-green, marked as above, but the ground-colour dominating the general impression.

A beautiful clutch taken by Whymper has a sea-green ground rather handsomely blotched with brown; another taken by Gill is pure immaculate blue, and yet another taken by Coltart has a clear brown ground.

Two hundred eggs average 42.0×31.4 mm. : maxima 46.1×33.1 and 45.3×40.0 mm. ; minima 38.0×30.2 and 40.3×29.3 mm.

Both sexes incubate and incubation takes about eighteen to nineteen days. If a first-laying is flooded out the birds lay again very quickly, and will again lay if a second disaster befalls them, though they are not normally double-brooded.

(2081) *Sterna melanogastra* Temm.

THE BLACK-BELLIED TERN.

Sterna melanogaster, Fauna B. I., Birds, 2nd ed. vol. vi, p. 127.

This little Tern is found commonly on all the big rivers in the North of India and Burma and less commonly in the South. It does not appear, according to Wait, to breed in, or indeed to wander into Ceylon, while Ticehurst says that its Western limits are the Indus Valley in Sind and that it does not occur in Baluchistan.

The breeding of this Tern agrees very closely with that of the larger bird, *aurantia*, the most noticeable differences being, first that they breed in even larger colonies, secondly that they make very shallow depressions in the sand for their eggs and, thirdly, that they frequently breed a little earlier. On sand-banks, where these and other birds breed together, the Black-bellied Terns generally lay first, then the River-Terns, while the Swallow-Plovers vary and are sometimes the first to lay and occasionally the last.

Sometimes the colonies are very large, and I shall never forget the first I saw on a huge sand-bank in the Brahmapootra. As our steamer came towards it, first a few scouts flitted overhead, then more and more until, as we passed the breeding place, many hundreds of them were on the wing, circling in and out, within a few yards of the steamer, in a never-ending dance, their shrill cries ceasing before we passed out of sight of their graceful wings. This was in March 1886, and when I visited the island in a boat the next day all the birds had eggs, in a few cases already partly incubated. I calculated the colony contained about 600 to 800 pairs, the nests, just shallow unlined scrapes in the sand,

being placed from just above water-line to some 10 to 15 yards inland, but so close together in parts that one had to be very careful in walking. On the upper part of the island there grew a few tufts of withered grass and a little *Equisetum*, but the nests were all in the open well below the crest. The sand-bank since then has come and gone many times, but when I left India, thirty years after first finding it, the same colony was yearly to be found on the same reach of the river, merely migrating from one sand-bank to another as the need arose. Other colonies only differed from this in numerical strength, and one found them as far up the rivers as there were sand-banks to breed on but, personally, I never found them on banks composed entirely of shingle, nor does Hume or his correspondents seem to have seen any such.

Most eggs are laid in the latter half of March and the first week of April, but many are laid in February and a few as late as May, though I think that in most cases these are second layings by colonies which have been flooded out.

They lay normally three eggs, sometimes two or four.

Looking at the eggs as a series one would call them dark sandy-coloured. Taken individually they prove to vary in ground-colour from pale sandy to a rather dark sandy buff, speckled or spotted sparsely all over with reddish or purplish-brown. Occasionally the blotches are slightly larger but very seldom at all conspicuous. The secondary marks are, similar but often larger, of pale grey or pale purple-grey. A few eggs may be found with a faintly greenish tinge, though the predominating colour is still sandy. An abnormal pair has the ground a pale sea-green fairly heavily marked with pale brown and purple-grey smears, larger on one egg than on the other. A very handsome three has a grey-green ground marked with conspicuous black blotches and with underlying grey and inky-grey blotches. In two of the eggs these are in heavy rings round the larger end and sparse elsewhere, while in the third they are scanty everywhere.

One hundred eggs average 32.4×24.9 mm. : maxima 35.8×25.1 and 31.8×26.0 mm. ; minima 30.2×25.1 and 33.3×23.4 mm.

In shape they are broad ovals, very slightly compressed at the smaller end ; the texture is about normal for small Terns' eggs and the surface glossless.

Both sexes incubate and incubation takes fifteen or sixteen days. In a dozen nests inspected in a colony, ten of which contained one or two eggs on the 1st April, all had chicks just hatched on the 18th of the same month, and as eggs of this small Tern are laid daily it fixes the period of incubation fairly satisfactorily. Two nests empty when seen on the 1st held three and four eggs each very hard-set on the 18th.

The young run with great rapidity as soon as the down has really dried, but usually at this age seek to escape attention by lying quite flat and still until the danger has passed.

Sterna hirundo Linn.

THE COMMON TERN.

(2084) *Sterna ^{hirundo} tibetana* Saunders.

THE TIBETAN TERN.

Sterna hirundo tibetana, Fauna B. I., Birds, 2nd ed. vol. vi, p. 130.

This race of the European Tern breeds in Ladak and Tibet, at great elevations, and in Central Asia.

Ludlow (Ibis, 1928, p. 225) thus describes the breeding of this Tern in Tibet:—"This bird appears at Gyantse about the middle of April and leaves late in September. I have taken its eggs in the stony bed of the river at Gyantse in mid-June. On the Kala-Tso and Hram-tso it is very numerous, and it breeds on the shores and islands of these lakes in great numbers.

"Sometimes a solitary nest is found, but more often the bird breeds in colonies. The nest is frequently built amongst a small mass of dried weed and grass, but it is sometimes a mere scrape amongst pebbles on the bare ground. The parent birds generally betray their position by their cries and behaviour. Often they show great boldness, and one bird stooped like a falcon on me twenty or thirty times whilst I was photographing the nest. Clutches vary from one to three."

The first eggs I saw of this Tern were some taken by Ward's collectors in Ladak and said to be those of the Red Wattled Lapwing. They were taken at about 12,000 feet, and when sent to me I of course saw they were Terns' eggs of some kind, and then Ward at once realized the mistake which his man had made and told me that the man had shot and sent him skins of Terns taken on the same date and in the same place. They were "found in scrapes on the shores of a big lake."

Macdonald sent me a fine series taken at Hram-Tso at an altitude of some 13,000-14,000 feet, where there were apparently many colonies of from 100 to 200 pairs of birds breeding principally on the mud shores of the lake and also on islands. Mr. Macdonald informed me that in some cases "the birds made nests of rushes and rubbish" and each nest contained two or three eggs or young. On the 26th June he obtained some twenty to thirty nests with very hard-set eggs, but most had already hatched.

La Touche records the breeding of a Tern identified as *tibetana* in North-East Chihli, China, in the end of June and July.

The breeding season seems to be from the end of May to the end of June, possibly varying somewhat according to the weather in late Winter and Spring. It is possible that they breed over a very wide area, and among other places recorded Ludlow found a small colony at Gillam on the Tekkes River, Tianschan, in early May

making their nests on small grassy tussocks in the middle of a shallow swamp.

The full clutch of eggs is two or three, perhaps two more often than three, while the single eggs seen by Ludlow in Tibet were probably incomplete clutches.

In appearance they are just very ordinary dull, uninteresting replicas of those of the Common Tern, but doubtless if big series were examined they would range through the same varieties as the eggs of that bird. The dominating ground-colour of those I have seen is a pale dull grey-green spotted and blotched rather freely with dark brown, reddish-brown or blackish. The secondary blotches are lavender-grey or grey, often with a pinkish tinge. In other eggs the ground may be yellowish-stone, pale buffish-stone to bright dark buff. The markings are the same but generally more reddish.

Fifty eggs average 41.0×30.5 mm.: maxima 47.4×31.1 and 42.1×33.1 mm.; minima 39.1×30.0 and 41.0×29.0 mm.

Sterna dougalli Montagu.

THE ROSY TERN.

(2086) *Sterna dougalli korustes* Hume.

THE EASTERN ROSY TERN.

Sterna dougalli korustes, Fauna B. I., Birds, 2nd ed. vol. vi, p. 132.

This beautiful little Tern breeds in Ceylon, the Andamans and the islands of the Mergui Peninsula.

Parker, quoted by Hume, gives a very full description of the breeding of this Tern in Ceylon:—"June (*Adam's Bridge*). On a small low bank there was a colony of some 200 pairs of this beautiful Tern, all breeding. The birds were extremely tame, settling on the nests when I was only 30 yards distant. At short intervals the whole flock rose in a crowd, screaming loudly, and after flying about half-way towards me, returned to the eggs. Many, however, came on and made persistent swoops within two or three feet of my head, some of them almost alighting on it, uttering a loud scream at the time, with occasional hoarse notes. A bird noosed on the nest proved to be a male. Some twenty pairs of *S. sinensis* were breeding in this colony; as a rule their nests were not mixed up with the others and were much more scattered. Some nests of *S. bergii* were in the midst of those of the Rosy Tern.

"The nests were from a foot to six feet or a little more apart, extending in a broad semicircle along the highest ridge of the sand, which was in no part more than two feet above the water-mark, and generally not more than six inches above it. At high tide some of the nests were evidently surrounded by water. All were small

hollows scratched in the sand, from 4 to 6 inches wide and from $\frac{1}{2}$ to $1\frac{1}{2}$ inches deep; some few contained a partial lining of shells, and in one instance a ridge of them was raised round the nest. The sand taken out of the cavity was usually deposited in a small mound round the nest.

"The number of eggs laid was one or two."

In April 1922 and in February 1913 Wait found colonies of "some hundreds" breeding off the coast of the Southern Province, Ceylon, on small islands, while both Wait and Phillips found others in May, 1923 and 1925 in the islands of Ambalamgoda and Cimhalamgoda off the West coast.

In the Andamans Osmaston, Wickham and Anderson also found great colonies breeding together with *Sterna melanolauchen*.

The nests seem to vary considerably; most are scrapes in the sand just above high-water mark, sometimes decorated with small pebbles or shells, sometimes scantily lined with grass or debris. Phillips found one nest "a small pad of grass, in a hollow scratched out in the centre of a tuft of grass," while Wait also found one large colony "breeding on a sloping beach half overgrown with bents on the lee-side of a rocky islet."

The breeding season seems to vary greatly in different years in the same area. Thus in 1913 Wait obtained eggs in February and in 1922 in April; Phillips found hard-set eggs on the 5th May, 1923; Wait took others in the middle of April 1924; and finally he took fresh eggs on May 3rd, 1925. On the latter occasion he also found many young (Ibis, 1923, p. 605).

In the Andamans, though two may be the normal clutch, a single egg is incubated almost as often, and threes are practically never laid; off the coasts of Ceylon single eggs are not so often incubated, while in a good many hundreds of nests examined not a dozen sets of three eggs or young were met with.

The eggs are very like those of the Common Tern, but there are certain characters which distinguish them. In the first place they average decidedly smaller and they appear also to be comparatively a little longer and a little more compressed at the smaller end. In colour they are much the same, but the spots and blotches average smaller and often look as if they had been deposited while the egg was being turned round.

The most common ground-colour is a very pale yellow-stone or grey-stone, while it ranges from this to a warm brownish-buff, in a few cases almost pure brown. Some eggs have the faintest tinge of green, though this is quite exceptional; others are more cream than buff or yellowish, and I have one clutch which is almost rose-pink. The markings vary from numerous freckles and small spots, which is usual, to a few very large blotches, which is rare, of dark brown, reddish-brown, purple-black or black, with similar underlying ones of grey or lavender. In most eggs the markings are more numerous at the large end than elsewhere, and in some they

form well-defined zones but never caps. An occasional clutch is clouded and smeared, rather than spotted, and in a considerable number the secondary marks outnumber the primary. I have seen no eggs with hieroglyphics or hair-lines, but now and then the markings are rather longitudinal.

One hundred eggs average 40.2×29.3 mm.: maxima 46.8×28.9 and 42.1×31.0 mm.; minima 34.8×26.4 mm.

Both sexes incubate and both assist in feeding the young, but there seems to be no record of how long incubation lasts. Witherby ('Practical Handbook,' vol. ii, p. 708) gives the period for the British race as twenty-one days, but all our Indian Gulls and Terns seem to incubate for shorter periods than their Palearctic representatives, and incubation in India may prove to be eighteen or nineteen days.

*Sterna albifrons** Vroeg.

THE LITTLE TERN OR TERNLET.

(2088) *Sterna albifrons sinensis* Gmelin.

THE WHITE-SHAFTED TERNLET.

Sterna albifrons sinensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 136.

The White-shafted Ternlet is found on the coasts of Ceylon, Burma, the Malay Peninsula and islands and the coasts of China. In some of the deltas of the bigger rivers of India, and still more in China, it is often found at a considerable distance from the coast, in some instances as much as a hundred miles. Inland on the rivers its place is taken by the slender-billed River-Ternlet.

This Ternlet breeds on the shores of Ceylon and all the countries above enumerated, and probably also on the shores of most of the larger islands, while in Ceylon it is also found on the sandy banks of the great tanks. In China it was found by Commander Geoffrey Collett on the Yangtse River 1,000 miles from the coast, or nearly 1,600 miles if the course of the river were followed. Unfortunately no specimens were obtained of the birds, and it is possible that *pusilla* may be found to extend as far East as this, though this would be a great extension to its present known range.

The colonies are sometimes big, sometimes small, and may number anything from a dozen to two hundred pairs, but in Ceylon small colonies are the rule. Wait says of its breeding haunts that, in addition to the sea-shore, "Some birds during the breeding

* The division of this Ternlet into races is a very difficult problem, but a re-examination of the material available only confirms the conclusions I arrived at when writing the 'Fauna of India,' and I see no reason to eliminate any of the races then accepted except *scundersi*, which must now rank as a full species (see footnote under the heading of that bird).

season move inland to breed on the shores of large tanks such as Minneri, where the water is not choked with weeds and where the shore is gravelly. It also breeds on the sandy shores of lagoons. The nest is a shallow depression in gravel or sand, with little or no lining." Phillips also found it breeding on the Kuntalai Tank in the Eastern Province on a gravel-bank "which it shared with numerous pairs of Kentish Plover." Phillips, Commander Schwilp and Staff-Surgeon Jones all write of the nest as a scrape without lining, but occasionally there may be a meagre bed of fine grass bents.

The breeding season is late. In Ceylon a few birds lay in the end of May, but most in June and July and a few in early August.

Two eggs form the usual full clutch and occasionally three, while Phillips found one egg hard-set.

In shape they are broad ovals, very little smaller at one end than the other, variations in shape being rare. The texture is quite typical of a small Tern's egg and the surface is never glossy.

The ground-colour varies considerably but, in the majority, it is sandy and, like sand, may be pale yellowish or greyish, dark buffish or muddy brown-buff. In the majority also the markings consist of rather small blotches and spots of some shade of brown, ranging from reddish-brown to almost black and nearly always dark. In some the markings are larger and in none do they become small enough to be called specks. The secondary blotches are of grey or pale brown, and both these and the primary are sometimes more numerous at the larger end, though they never form caps or definite rings. Unusual eggs among my series are a pair taken by Phillips which has one egg pure white, with two or three black blotches; a single egg with a pale sea-green ground, heavily blotched with a few black marks; a third pair of eggs with a very rich buff ground marked with chestnut-brown.

One hundred eggs average 32.2×23.8 mm.: maxima 34.1×23.7 and 34.0×25.5 mm.; minima 29.3×23.0 and 31.2×22.5 mm.

Both sexes incubate.

(2089) *Sterna albifrons pusilla* Temm.

THE RIVER-TERNLET.

Sterna albifrons pusilla, Fauna B. I., Birds, 2nd ed. vol. vi, p. 137.

This Ternlet is found on all the larger rivers of Northern India and Burma, but becomes rarer as one works South, and it does not extend to Ceylon from India or to the South of Burma.

They are exclusively river-breeders and I believe are entirely confined to those rivers which have sandy banks and islands and, personally, I have never found them on muddy rivers or on mud-banks. Thus one never came across them breeding on the Barak

in the Surma Valley, yet in the bright clear waters of the Cherra, just where it joins the Barak, there was for many years a colony of about ten pairs breeding on a large island of pure sand brought down from the foot-hills. In the Brahmapootra and its many tributaries, on the Indus and other rivers of the Punjab, the Ganges and other similar rivers in India and on the Chindwin and great rivers of Upper Burma one colony after another will be met with in succession as one steams or boats down them. The colonies seem never to be of any great size, and most are under rather than over twenty pairs. Exceptions to this known to me included a colony on the Brahmapootra probably numbering nearer 300 than 200 pairs, while another colony on the Ganges numbered about one hundred pairs and others smaller on the Subansiri, while colonies on the rivers Ganges and Indus have been found of about forty pairs.

The birds, so far as I have experienced, never make any nest beyond a shallow scrape in the ground about 5 or 6 inches across and less than an inch deep, which is used as it is without any lining and without any decoration in the way of small shells or white stones in or around the hollow. Nor is the scraped-out sand piled round the nest, but is scattered about, so that there is no appreciable mound round the nest. I have been told that they sometimes breed in fine shingle, but I have seen no nests except in sand, and even these have nearly always been on the slope of the sand-bank rather than on the ridge. Even when made on the top of the bank and amongst the thin grass growing thereon the shelter of the tufts is not sought, and I have never seen a nest in thick grass, rush or *Equisetum*.

March and April are the two principal breeding months, though I have eggs taken in January and others late in May. On the big rivers of Upper Burma most birds lay in April.

The eggs cannot be distinguished from those of the common White-shafted Ternlet but, as a series, they are still more evenly sandy in appearance and it is extraordinary how these little eggs blend with their sandy surroundings.

One hundred and twenty eggs average 30.9×23.2 mm. : maxima 34.3×24.0 and 30.2×24.5 mm. ; minima 28.0×23.3 and 31.1×21.4 mm.

(2090) *Sterna albifrons prætermissa* Stuart Baker.

THE MESOPOTAMIAN TERNLET.

Sterna albifrons prætermissa, Fauna B. I., Birds, 2nd ed. vol. vi, p. 138.

Within our limits this little Ternlet has been found breeding by Ludlow at the Sonmeani swamp on the Mekran coast, whilst Pitman found several colonies of Little Terns breeding in Mesopotamia which I attribute to this slender-billed race.

Ludlow first obtained the eggs of this Tern at Sonmeani through his native collector, but no skins, and at the time I expected that they would prove to be those of *saundersi*, the race most likely to breed in such a place. Ludlow, however, did not think they could be *saundersi*, as they were breeding in swamps, a thing that bird never does, and in 1916 he obtained more eggs and a skin, which he sent me, and which I was then able to identify as not being *saundersi* and later, on comparison with Mesopotamian skins, as being of the race *prætermiassa*. Pitman says of the colonies found by him in the Euphrates Valley that the eggs were "found on the bare ground in desert land at the edge of a huge expansive inundation, the result of an overflow of a marsh." Ludlow found them also breeding in swamps, and Eates found a small colony of five or six pairs breeding in the dry—or almost dry—bed of the Habb River near Las Bela. The only other kind of place in which nests have been found are those taken by Cox and Cheesman on islands in the Persian Gulf.

In every case the nests are described as being merely unlined scrapes in the open, unsheltered by grass or bush. Again, in every case, so far as I have been able to understand, the soil in which the nests were made, though often termed sand, was more or less mixed with dried mud, and was, therefore, very dark and muddy looking. This is a most interesting point when we consider the eggs.

The colony at Sonmeani is a big one. On one occasion Ludlow obtained more than fifty eggs from it; Pitman also speaks of both large and small colonies, but the colony in the Habb only contained five nests. The scrapes are close together, often three or four within the compass of a square yard, and are not scattered wide apart like the nests of *saundersi*.

The breeding season is late. This Ternlet has not to hurry forward its domestic arrangement so that the chicks can be got away before the great floods come, and consequently it waits to breed until much later. Most birds apparently lay in June, but in the islands of the Persian Gulf Cox and Cheesman obtained eggs in the third week of May, while on the Habb they were just starting to lay on the 9th July.

Most clutches number two only, but three are occasionally laid, while Cox once found a single egg very much incubated.

The eggs are typical Ternlets' eggs in most respects—shape, texture and colour—but, as a series, are much more darkly and richly coloured than any of the eggs of the other races. The first clutch sent me by Ludlow is exactly like those of *saundersi* but rather deep in colour, sandy buff with small blotches of reddish scattered over the surface. Most eggs have a ground-colour similar to that of mud and sand mixed, the blotches, of very dark brown or blackish, being larger and bolder than in those of other races. The secondary marks are of inky grey or purple-grey, rarely pale grey, and are of the same character and nearly as numerous as the primary. Occasionally

the ground has a greenish tinge and frequently a brown tint. In one of the former the large blotches of blackish-brown and deep grey stand out very holdly and the eggs are exceptionally handsome.

Thirty-four eggs average 31.9×23.9 mm. : maxima 33.0×24.6 and 31.2×25.0 mm. ; minima 27.9×22.0 mm.

Both sexes incubate, as a male bird has been trapped on the eggs.

As I have already said, it is most interesting to note how the eggs of these little Terns assimilate with their surroundings. We have the river birds laying eggs which can hardly be discerned from a little distance, dark sandy in colour, like the sand they lay on ; the swamp-baunting birds with eggs darker, duller and less buff, similar to the sunburnt mud and sand on which they lie, and then we have the pale bright sandy-coloured eggs laid by our next bird, *saundersi*, on the pale yellow sands of the sand-mounds of the Sind and Mekran coast.

(2091) *Sterna saundersi* * Hume.

THE BLACK-SHAFTED TERNLET.

Sterna albifrons saundersi, Fauna B. I., Birds, 2nd ed. vol. vi, p. 138.

So far as we know the Black-shafted Ternlet breeds only on the Mekran coast and in Sind down to the Rann of Cutch, where Bulkley records its breeding. Parker's notes on the breeding of this Ternlet in Ceylon probably all refer to *sinensis*, as do those of Legge. Wait says that it is not uncommon in Ceylon during the North-East monsoon, but there is no evidence that it ever breeds there. So, too, it has been recorded from the Somali coast and from the Red Sea and Persian Gulf, but as yet there is no proof that it breeds anywhere in these places.

The breeding habits of this Ternlet are different to those of any of the other races, and as a rule it breeds on sand-hills, often at some little distance from the sea. Butler, in Hume's 'Nests and Eggs' (vol. iii, p. 314), gives the only description of the nesting of these Terns (under the name of *sinensis*) which differs from others. He writes :—" At Kurrachee on the 6th May, 1877, I noticed several of these Terns flying backwards and forwards over the maidan between the Camp and Clifton. I got out of my trap and commenced a search for eggs. The soil was slightly damp from the effect of tidal inundations, with here and there patches of hard

* As this MS. was going to press I received a letter from Mr. W. E. Wait saying that he had found a small colony of these little Terns breeding on the N.W. coast of Ceylon quite close to the mainland, where *S. a. sinensis* also breeds. The two were not breeding in quite the same place and do not breed at the same time, but the fact that they breed in the same area finally determines the status of *saundersi*, which must now be given the full rank of *species*. Legge's and Parker's notes we may now accept as correct.

dry incrustated ground, covered with saline efflorescence, and on these patches the nests were situated. I also found nests on the same maidan, on ground cut up by Artillery gun-carriages, the eggs being deposited in the wheel-ruts and in the horse's foot-prints."

Butler took many nests here from the 6th May to the 11th June.

Generally speaking (*vide* Harrington Bulkley, Betham, Ludlow, Eates and others) these little birds breed on the sandy shores and sand-hills along the coast-line, sometimes within reach of inundations of the sea, at other times as much as a mile or more inland. The favourite place seems to be a fringe of low sand-hills along the coast-line and close to it, from which numerous collectors have sent me eggs. The birds lay in depressions in the sand, either made by themselves or natural, or made by some animal or even man, as Ticehurst says (*Ibis*, 1924, p. 144) that on one occasion they laid in a print made by his own foot. Harrington Bulkley, and again Ticehurst, refer to this birds penchant for the little mounds of sand which collect round the remains of any vegetation, such as tufts of grass or *Sueda*-bushes, making their nests in a depression at the top. Ticehurst also notes: "a piece of sun-baked 'blanket-weed,' like a slab of grey felt, is nearly always occupied. On stony ground a hollow may be made or not according to circumstances."

The birds breed in colonies, but the nests are widely scattered. Bulkley, in one of his letters to me, writes:—"I found seven nests today, but they were all scattered about and not in colonies, so that they are very hard to find and I had to cover an awful lot of ground to get them." As a rule, however, the birds breed in colonies of half a dozen upwards within a space of some hundreds of yards, but their actions give away the approximate site of the nest, though the eggs may take some spotting. Betham records that when anyone is hunting for their eggs the birds fly constantly backwards and forwards overhead, calling continually and often swooping down with great pluck and perseverance as the intruder gets closer to the nests.

The principal breeding season is June, but Betham obtained eggs as early as the 27th April, and Ticehurst says that they also breed up to the first week in August.

Two eggs are almost invariably laid, one only not very rarely, and I have only heard of two clutches of three eggs, both taken by Harrington Bulkley.

The eggs may be separated as a series from all other Ternlets' eggs by their exceptionally uniform pale sandy-grey tint. I have perhaps had some two hundred clutches of this Tern to examine, and I do not think I have seen half a dozen that could be called in any way unusual. The ground is a pale yellow- or grey-buff, just the ordinary tint of dry sand. I have one pair which might be called brown-buff and two or three in which the markings stand out sufficiently boldly and darkly to call attention to them in a series.

Eates, who has seen an enormous number of this Ternlet's eggs, told me that he has sometimes examined dozens of clutches without seeing one worth picking up.

One hundred eggs average 31.7×23.6 mm. : maxima 35.0×25.1 and 34.0×25.5 mm. ; minima 29.5×23.0 and 32.0×22.25 mm.

Both sexes incubate, but I have no note on the length of the incubation period.

The destruction of the eggs of this Ternlet is very great. Ticehurst remarks :—"Twice in one season the whole of one colony was swept away by monsoon tides, while foxes, dogs, jackals and kites are incessantly taking their toll." To these may be added lizards, rats (near Karachi) and all the mongoose tribe.

Sterna sumatrana.

THE BLACK-NAPED TERN.

(2092) *Sterna sumatrana sumatrana* Raffles.

THE BLACK-NAPED TERN.

Sterna sumatrana sumatrana, Fauna B. I., Birds, 2nd ed. vol. vi, p. 139.

The Black-naped Tern breeds on the Andamans, the coasts and islands off Tenasserim and the Malay Peninsula, extending to many of the islands as far as the Celebes. It is also said to occur on the Seychelles and Amirante Islands and in the Loochoo Islands and Cape Yeh in North Australia. It breeds often in very large colonies on the coasts and islands on sand, shingle or rocks, making no nest beyond a depression in the sand and frequently on bare rocks. The scrape is made by the birds in the sand and shingle, rarely with a scrap or two of seaweed or débris (B. B. Osmaston) as a lining, generally with none at all. In the Andamans Osmaston, Wickham and Anderson found them breeding on Snake Island and other islands in company with colonies of the Rosy Tern, and care had to be exercised in identifying the nests and eggs. The scrapes seemed to be made indifferently in sand or shingle, but in many cases the eggs were found lying on the bare rock with no hollow for them to lie in.

June is the normal breeding month, but Wickham took one clutch in September, though possibly in this case the first broods had been flooded out.

The number of eggs laid is almost invariably two ; occasionally only a single egg is incubated, and I have seen one clutch of three.

Individual eggs cannot be separated from those of the Rosy Tern but, as a series, the eggs of this species are less speckled and more boldly blotched than those of that bird.

The ground-colour in the great majority of eggs varies from practically white to pale cream or very pale buff, and I have seen

no eggs with a greenish tinge. The markings consist of specks, spots or blotches of chocolate-brown, red-brown or purple-black, with secondary ones of pale grey, rather pinkish-grey or neutral tint, of the same character as, but less numerous than, the primary markings. Whether large or small, most eggs have these more freely dispersed at the larger end than elsewhere. Occasional eggs have the curious rotary effect caused by the markings being laid on in a cross slanting direction, but not nearly so frequently as in the eggs of the Rosy Tern.

Among exceptional eggs may be mentioned the following types :— (1) Ground pale pink, handsomely blotched with large chestnut markings ; (2) bright clay-buff with a few big blotches and smudges of deep chestnut-brown and pale grey ; (3) deep brown-buff, profusely marked all over with small blotches of blackish-brown and deep chestnut ; (4) white ground, with a ring of small blotches of black and of grey at the larger end, and with a few black specks and blotches elsewhere.

In texture the eggs cannot be separated from those of the Rosy Tern, while in shape they range from broad obtuse ovals to long, rather pointed ovals, most eggs inclining to the latter.

Two hundred eggs average 39.6×28.6 mm. : maxima 48.3×28.1 and 38.7×30.1 mm. ; minima 34.6×28.1 and 40.0×25.9 mm.

It is rather curious that different colonies of these Terns seem to have a dominant character in the eggs they lay. Thus one colony seems to lay eggs on an average darker and more boldly marked, a second has them paler and more speckly in character, while a third may have more buff eggs than either of the other two, with markings intermediate in size and number.

Both sexes incubate, but the period of incubation is not recorded.

Family RYNCHOPIDÆ.

(SKIMMERS.)

(2100) *Rynchops albicollis* Swain.

THE INDIAN SKIMMER.

Rynchops albicollis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 150.

The Indian Skimmer breeds on all the larger rivers of India and Burma, becoming less common towards the South and not extending into Ceylon. Wickham seems to think it is not common in Northern Burma, but Harington, Hopwood, Mackenzie and others have all seen numerous colonies on the bigger rivers from the Chindwin to the Shan States.

On the Brahmapootra the bird is common but only breeds in small colonies, between a dozen and thirty pairs, while both Harington and Hopwood record similar small colonies in Burma. In India, also, I think colonies of about a dozen to a score of pairs are most often found but, occasionally, they may number as many as a hundred.

They breed exclusively on sand-banks in big rivers and invariably choose sites on open bare sand rather than those parts on which there is any growth of grass, equisetum, or bush. In the majority of the colonies I personally inspected the nests have been placed close to the water, the nearest often only a yard or two distant and the farthest away perhaps fifteen or twenty yards. Sometimes, however, they select a spot higher up on the banks. Hume says of one such colony: "The eggs were on perfectly bare sand. Other portions of the bank were thinly sprinkled with tiny Jbao bushes, but they had chosen a perfectly bare flat some fifty yards from the water's edge and some two feet above its level." Gill also sent me some eggs taken "from a high sand-bank in the river (Oude), the nests all along the crest and a long way from the water's edge." Other eggs, however, taken by him were taken from a colony of "a few pairs of birds breeding on an island in the Ganges in company with a large colony of *Sterna seena* and a few *Glareola lactea*. The nests of the Skimmers were all scattered along the edge of the island, mere depressions in the sand, not protected from the sun in any way, and without a vestige of lining. The day after I saw them the river rose and practically every egg and young bird on the island was destroyed."

The nests I have seen have all been like those described by Gill and Hume, merely depressions in the sand measuring about 4 to 5 inches in diameter and about $\frac{1}{2}$ to 1 inch in depth in the centre. There is no lining and, as the nests are always made in sand and not in shingle, there are never any stones in them and only rarely bits of shell. The only exception I have seen was in a small colony built on the top of a sand-bank in the Brahmapootra, on a bare patch of sand about four yards across, surrounded by some bushes (? Tamarisk), scraps from which lay everywhere on the sand and many in the nests, probably merely wind-blown into them.

The breeding season is from the middle of February to the middle of April. Hume says: "In the Ganges and its affluents the majority seem to lay in March; in the Indus and its tributaries in April." In the Brahmapootra many birds lay in February and others in March but I have taken eggs in May. Even in the Indus Rattray took eggs from a large colony as late as the 18th May, while in Burma April seems to be the normal month for egg-laying. It is interesting to note that the late-laying birds generally belong to comparatively large colonies who breed high up on the largest sand-banks in positions which are safe until the high floods come in June. On the other hand, birds which lay early on falling water sometimes place their nests within a few inches of it.

The number of eggs in a clutch varies. In Assam and Burma three are generally found, sometimes two only; in Bengal and Bihar three generally and rarely four; while in the United Provinces, Punjab etc. four seems to be the usual complement!

The eggs are like those of the true Terns but have a character of their own, though this is difficult to describe. According to Hume, "when fresh the ground-colour exhibits a variety of delicate and beautiful tints—pale pinky buff, cream, or stone-colour. Delicate greenish or greyish-white, pale *café-au-lait*, and pale salmon-colour are among the most common. The markings consist of bold blotches and streaks, chiefly the latter, of rich umber, chocolate, or reddish-brown, occasionally so intense as to be almost black, underlaid by similar streaks and blotches of more or less pale ink purple. In the majority of the eggs the markings, as a whole, have a remarkably streaky character, the streaks running not parallel, but at an angle of about 30° to the major axis, seeming to be, as it were, twisted round the eggs. The markings appear to turn always in the same direction, and holding the egg with the broad end uppermost and calling that the north, they have a set from N.N.E. to S.S.W."

There is little one can add to the above. I should call the most common type of ground-colour pale yellowish-cream to buff; the streaks I should term longitudinal blotches, as they are very broad, never becoming hair-lines or hieroglyphics.

In shape the eggs are generally broad ovals but distinctly pointed and smaller at one end than the other. Other eggs are moderate to rather long ovals. The texture is closer and finer than in Terns' eggs of the same size and often the surface has a slight gloss.

One hundred and eight eggs measured by Hume averaged 1.6×1.18 inch ($=40.6 \times 29.7$ mm.), while sixty measured by myself average 41.0×29.9 mm. σ maxima 44.2×31.0 and 42.9×32.0 mm.; minima 37.4×31.0 and 43.1×28.0 mm.

The male assists in incubation but I have no knowledge as to how long this lasts.

When their nests are being robbed or when a jackal, kite or other vermin approaches their breeding ground, they do not get nearly so excited as the Gulls and Terns, though they fly round constantly twittering but never actually attacking. I once saw a jackal slinking across a sand-bank, when he was at once attacked by all the Terns, River-Terns and Black-bellied Terns, as well as by the Swallow-Plovers, while the Skimmers took no notice at all so far as I could see.

Suborder LIMICOLÆ.

Family CHARADRIIDÆ.

(PLOVERS and OYSTER-CATCHERS.)

Subfamily PRE-CHARADRIINÆ.

(TURNSTONES, GREY-PLOVERS etc.).

(2105) *Eupodella vereda* (Gould).

THE EASTERN SAND-PLOVER.

Eupoda vereda, Fauna B. I., Birds, 2nd ed. vol. vi, p. 159.*Eupodella vereda*, ibid. vol. viii, p. 695.

The breeding haunts of this Sand-Plover are not yet really known. They *may* be in the far North or North-East or they may be somewhere in the lofty plateaus of Central Asia.

All that we know about the breeding of this Plover is that remnants of a skin were sent me by Rattray with a single egg, one of a clutch of four. The skin was in fragments consisting of two wings and patches of back and breast, but sufficed to identify the bird, which was said to have been shot off the egg.

This is not a pyriform egg like those of *Leucopoli* or the *Charadrius dubius* group but is shaped like a Dotterel's egg and is also, in colour, not unlike a weakly marked egg of that species. The ground is pale yellow-fawn, with small speckles and spots all over of black, more numerous at the larger end, but profuse everywhere. The secondary spots are of rather dark grey and are similarly distributed. The egg measures 38·4×27·0 mm. It was taken on the 2nd June, 1888, at Tso Moriri Lake in Ladak, at an elevation of 12,500 feet.

Leucopoli alexandrinus.

THE KENTISH PLOVER.

(2106) *Leucopoli* alexandrinus alexandrinus (Linn.).

THE KENTISH PLOVER.

Leucopoli alexandrinus alexandrinus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 161.

The Kentish Plover breeds over the greater part of Europe and Western Asia through Mesopotamia to Sind and the Rann of Cutch.

A most excellent account of the breeding of this little Plover is given by Ticehurst (Ibis, 1923, pp. 655-7), which also includes a summary of other observers' notes. He writes:—"The Kentish Plover is common all down the Indus in Winter and is found round some of the inland waters. It is, however, most abundant at Karachi. It breeds early: I have seen young out in two years on 7 and 8 April, while Mr. Cumming has found young as early as 9 March, but many by mid-April have not yet begun to nest. I have found fresh eggs on 11 May, while Mr. Bell records eggs in June and July, but I am not at all of opinion that more than one brood is reared.

"In the vicinity of its breeding ground this Plover nests in a variety of places in the sand-hills or just above high-water. The nest is a scrape lined with shells. If sheltered, the nest is betrayed by foot-marks converging to the nest; if open, the eggs are almost buried by drifting sand; while Mr. Ludlow has found eggs under an old tin and quite hidden from view, and so protected against drift. On open desert I have found nests quite half a mile from the creeks; another favourite site is on the saline desert, where mounds of blown sand collect round salt-plants (*Sueda*), and on the top of these mounds, some two feet above the plain, the nest is made; the eggs are sometimes almost hidden by the plant, whose dried fleshy leaves are used as lining in lieu of shells."

Usually the nest is just a scrape in the sand, lined with small scraps of shell, tiny pebbles where these are available or, failing both, bits of dried grass in chips or small leaves.

The breeding season in India seems to be a very long one. Some birds must breed in February, as Cumming found young ones on the 9th March and Ticehurst also saw young on the 7th and 8th April, but probably most birds lay in April. Bell took fresh eggs as late as June and July and Bulkley took a clutch on the 15th July and another on the 6th August.

On the islands in the Persian Gulf Cox and Cheesman found them breeding in March. The normal full clutch is three in India as in Europe, but two only are sometimes incubated and very rarely four are laid.

In shape the eggs are sharply pointed ovals, often almost peg-top shape; the texture is fine and fairly close but the surface glossless.

The ground-colour varies from pale sandy to dark sandy brown, occasionally tinged with olive or buff. The markings consist of small specks, blotches and spots of brown that is almost black, or black. Very often these are much mixed with twisted hair-lines and scrolls of the same colour and in some eggs the lines replace the specks and spots almost entirely. The marks are almost invariably more numerous at the larger end and, sometimes, especially in scrolled eggs, show fairly defined rings or zones. The general impression given by a series is of speckled and scrolled eggs rather than of spotted eggs as in the *Charadrius hiaticula* group.

Jourdain gives the average of one hundred eggs as 32.5×23.5 mm. :

maxima 35.2×23.7 and 32.0×25.0 mm.; minima 30.2×23.2 and 32.0×22.5 mm.; Indian eggs give practically the same average, but the minima are 31.1×23.1 and 32.0×21.5 mm.

Both sexes incubate and, while the female is sitting, the male usually keeps watch from some little eminence near by. Ticehurst says that in Sind, "by hiding up, one can observe what extreme caution the male takes before signalling to the female to return to the brood; he flies off to a mound, and remains some time having a look round; satisfied, he flies to another and repeats his vigil, and so on all round the compass, until certain all is clear."

Both sexes feign injury or illness in order to attract attention away from the nest, fluttering along as if one wing was broken or tumbling about as if seriously injured, at the same time gradually leading the pursuer away from the nest. This trick is resorted to whether there are eggs in the nest or young in hiding but more often in the former case.

Naumann gives the period of incubation as 15-17 days.

(2107) *Leucopoliuss alexandrinus seebohmi* (Hartert & Jack.).

THE INDIAN KENTISH PLOVER.

Leucopoliuss alexandrinus seebohmi, Fauna B. I., Birds, 2nd ed. vol. vi, p. 162.

The Indian form of this little Plover breeds commonly in Ceylon and is said also to breed on the shores of the Red Sea and coast of Somaliland, where one would have expected to find the typical form, if any.

Under the name of *Ægialitis cantiana* Legge gives a good account of the breeding of this bird in Ceylon (P. Z. S. 1875, p. 374); he writes:—"A chain of shallow lakes or salt-pans fringe the coast in this flat district for many miles to the North of Hambantola; they are situated at about $\frac{1}{4}$ of a mile from the sea-shore, being separated from the beach by a narrow strip of jungle through which there is no communication with outer salt-water. The salt-pans are of great extent, many of them being more than 10 miles in circumference; but in the hot weather they become partly dried up, leaving around them a wide belt of foreshore consisting of a mixture of mud and sand, covered in many parts by tracts of shell-fragments. In places these gravelly shell-wastes are worked into little mounds and hollows by the feet of cattle driven along the shores of the *lé-ways* to their feeding grounds. In these spots I invariably found *Ægialitis cantiana* nesting. On the top of a little mound six inches high there would be a small hollow worked out and bottomed with a number of little shell-fragments, just large enough to contain three eggs. This was the general number of eggs and was never exceeded; in some I found two and in others, in which the clutch was not complete, only one. My eggs were taken between the

27th June and 14th July, and were in most instances far advanced in incubation, beside which a fair proportion of nestlings were observed."

Wait took many eggs round about Puttalam between the 27th May and 8th August and says that "they breed fairly freely in the sandy pastures bordering the lagoon near Puttalam. It generally chooses a rather bare spot and never lays in grass. It often chooses a desiccating patch of cow-dung as the actual site for the scrape. It generally lays two eggs, but about one in four are threes. When the clutch is complete, but more especially when there are three, the bird half buries them in the sand, with the points inclined downwards, so that only the round tops are visible. The breeding season extends from the end of April to early September."

Legge also found these little Plovers breeding near Trincomalee in a dried-up field and at Kantelai Tank on shingly banks, both at the end of July.

The breeding season lasts, as Wait says, from the end of April to early September, but the great majority of eggs are laid in June and July.

Either two or three eggs are laid which are just small replicas of those of the Kentish Plover but, perhaps, average a little darker and are slightly more heavily marked.

Forty eggs average 29.9×22.0 mm. : maxima 33.2×22.0 and 29.9×23.4 mm. ; minima 29.1×22.3 and 29.3×21.8 mm.

In its breeding habits etc. it differs in no way from its European relation.

Hæmatopus ostralegus.

THE OYSTER-CATCHER.

(2111) Hæmatopus ostralegus osculans Swinhoe.

THE CHINESE OYSTER-CATCHER.

Hæmatopus ostralegus osculans, Fauna B. I., Birds, 2nd ed. vol. vi, p. 166.

The distribution of this bird extends from extreme Eastern Bengal, through Northern Burma and China, to Japan but, so far as I know, there is nothing recorded as to its breeding habits, nests and eggs, beyond the measurements of two eggs given by Jourdain (Vög. pal. vol. ii, p. 1678) from E. Siberia.

I can add nothing definite beyond the fact that Messrs. Fawcett and Stanford found a pair of Oyster-catchers breeding on a sand-bank in the Sunderbunds, Eastern Bengal, and obtained two eggs which the former has most generously given to me. As I have not been able to examine the skin, it is impossible to say to what race it belongs and it may eventually prove to be either the present race or *longipes*, which breeds in West Siberia and Turkestan and which Hartert says occurs in India in Winter.

The two eggs given to me by Fawcus are just like ordinary eggs of the Common Oyster-catcher; in shape rather unusually broad ovals but of normal texture and surface. The ground is a rather deep brownish-buff, the surface freely spotted with primary markings of black and secondary ones of lavender and dark grey, just a trifle more numerous at the larger end than elsewhere. They measure 53.6×39.7 and 52.5×40.0 mm.

The two eggs measured by Jourdain from Siberia are 57.4×36.4 and 59.3×37.3 mm., much longer ovals in shape than those taken by Fawcus.

Charadrius dubius Scop.

THE LITTLE RINGED PLOVER.

(2114) *Charadrius dubius euronicus* Gmelin.

THE EUROPEAN LITTLE RINGED PLOVER.

Charadrius dubius euronicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 171.

The breeding range of this little Plover extends over the greater part of Europe, North and Central Asia to North-East Siberia.

I have no personal knowledge of this race of *dubius* breeding within our limits, but Kinnear and Ludlow are convinced that it is the form breeding in Kashmir. I have a fair number of eggs given to me by Ward, Bates, Livesey and others and these certainly do not bear this out. I should note, however, that my eggs all come from low elevations such as the Woolar Lake, at about 5,000 feet. In measurements these eggs average exactly the same as those from the plains and are decidedly smaller than those of the European bird. At the same time it is quite possible that we have both races breeding in Kashmir—*euronicus* in Gilgit, Northern Kashmir, Ladak etc. at high elevations, whilst *jerdoni* breeds in the South at elevations of 5,000 feet and under.

It breeds in Europe in April, May and June according to latitude and lays the usual clutch of three eggs which only differ from those of the Indian bird in their greater size. Jourdain gives the average of one hundred eggs as 29.8×22.1 mm.; maxima 32.8×23.0 and 30.1×23.5 mm.; minima 27.3×21.1 and 28.6×21.0 mm.*

According to Witherby the period of incubation is twenty-two to twenty-four days and the birds are single brooded. Both sexes carry on incubation.

* In one of his interesting letters to me Ludlow writes:—"As regards *Charadrius d. euronicus*, I think you are wrong in stating in the 'Fauna' that this race does not breed within Indian limits. I obtained a skin and chick of what I take to be *euronicus* which I found breeding in May last on the Bringhi River whilst fishing. I have also obtained *euronicus* on the Shyok in Ladak in July, and last year Duncan got it in May on the Wardwan River. It is pretty certain all these birds were breeding or had bred where found."

(2115) *Charadrius dubius jerdoni* Legge.

THE INDIAN LITTLE RINGED PLOVER.

Charadrius dubius jerdoni, Fauna B. I., Birds, 2nd ed. vol. vi, p. 171.

This little Plover breeds practically all over India, Burma, Ceylon, the greater part of the Malay States, Siam, Annam and Cochin China.

In India it breeds from Kashmir, certainly up to 5,000 feet, and in suitable places all over the plains. On the North-West Frontier Rattray found it common at Thall and breeding there and elsewhere. At Kohat, under the name of *C. dubia*, Whitehead records it as very plentiful and remarks:—"This species passes through Kohat in small flocks" (? *curonicus*), and "On the gravelly shores of the Kurram it breeds abundantly from Thall up to Dandar" (Ibis, 1909, p. 274).

It breeds on sand-islands in rivers and also on their sandy banks; on gravel and shingle beds in the same positions; on the seashore and on the shores of lakes and tanks and sometimes even on waste land and open spaces at a considerable distance from water. Often they breed on sand-banks in small, scattered colonies in company with other species. I have myself found them on sand-banks in the Brahmapootra breeding with Swallow-Plovers and with Black-bellied and River-Terns, but the nests are scattered, often only one or two were found on a bank and I have never heard of nor seen more than six. The colonies, if they can really be called such, may be found scattered along a sea- or lake-shore or river-bed, perhaps half a dozen in a stretch of some hundreds of yards, and then a long gap without a single pair and then another small number of nests and so on. The birds prefer sand or small shingle but they also sometimes lay among big stones and boulders.

Beyond a shallow scrape, about 4 inches wide by 1 inch deep, there is no nest, nor is the scrape even lined or decorated with shells and stones when in sand. When among bigger stones a site is selected from which those too large are ejected and those suitable formed into a neat little saucer. Very often the birds choose a spot close to some conspicuous object, such as a fallen tree, a log, a bush or a big boulder, and we found this to be especially the case in Bihar, where the birds were breeding on sand-banks, bare except for water-borne bits of wood and similar objects.

The breeding season is from early March to late April in the plains but near Allahabad a correspondent of Hume's took four eggs on a sand-bank in the Gauges on the 7th February. In other places it is recorded that Burgess took eggs in the Deccan in April, Blewitt in the Mahanuddy in March and April, while Davidson and Wenden say that in the Deccan they breed from December to May. In Bihar Coltart, Inglis and others found them breeding in March and April, rarely in February and May; Barnes found nests in

May at Neemuch, while in Kashmir Livesey found eggs on the Wular in May and June. In Burma late March to early May also seems to be the breeding season.

The most usual clutch consists of three eggs, but fours are not rare and, occasionally, only two eggs are incubated.

In shape they are ovato-pyriform, often almost peg-top in shape. The texture is rather fine but not very close and the surface is always glossless.

The ground-colour varies from pale sandy yellow, which is rare, and pale sandy grey to much deeper tints of the same, while the markings consists of numerous freckles, specks or tiny blotches of blackish, mixed with secondary very inconspicuous specks of grey. In some eggs there are a few very short lines and twists, while in a few others these are more numerous; the general effect, however, is nearly always that of a finely speckled egg.

Erythristic types are not rare, having the ground a bright orange-buff, while an oviduct egg taken by Rattray had a beautiful blue-green ground when fresh, though this has now faded to a dull grey.

Sixty eggs average 27.5×20.7 mm.; maxima 29.5×20.8 and 27.4×21.6 mm.; minima 25.0×19.6 and 26.1×19.0 mm.

Cirrepidesmus mongolus (Pallas).

THE LESSER SAND-POLOVER.

(2117) *Cirrepidesmus mongolus atrifrons* (Wagler).

THE PAMIRS LESSER SAND-POLOVER.

Cirrepidesmus mongolus atrifrons, Fauna B. I., Birds, 2nd ed. vol. vi, p. 174.

This Sand-Plover breeds in the high plateau lands of the Pamirs, Kashmir, Ladak, Tibet and North-West China at elevations over 12,000 feet. It probably also breeds in parts of Turkestan and possibly in North-West China.

We have two good accounts of the nesting of this Plover in 'The Ibis,' 1925. In the first Whistler (p. 203) writes: "I first met with the Mongolian Plover at the Chandra Lake (14,000 feet) in 1922 on 10-11 July, when at least five pairs were breeding on the stretches of stony waste about the lake. Two clutches of well-incubated eggs were taken and three downy young captured. On 24 July a breeding pair were seen at Tharcha camping-ground (13,500 feet) in Spiti, a few miles away from Chandra Lake, but on the other side of the Kunzum range.

"Next year I found that the species also breeds on the Northern slopes of the Baralacha range. On 23 and 26 of July a few odd birds and a party (apparently including young of the year) were

seen about the Yunnan Lake. On 25 July two pairs were met with on their breeding ground, a few miles beyond the lake on the commencement of the Lingti Plain between Kinlung and Phalang Danda. Careful watching showed that both pairs had partly feathered young and I succeeded in catching a chick from each brood.

"The two nests found at the Chandra Lake were very similar; in the first the eggs lay in a hollow amongst the trailing stems of a small creeping ground-plant with a wood-like stem; broken fragments of the stem were placed to form a slight lining to the hollow. The nests was about 100 yards from the margin of the lake, on the shingle-spread plain at its north-western end.

"The second nest was a slight hollow lined with broken chips and fragments of stem of the same plant on a marked ridge in the broken ground, a mass of shallow ravines and low mounds, that marked the debouchment of a large nullah of the main Kunzum range. The nest was, therefore, some height above the level of the waters of the lake and about a quarter of a mile from its edge."

Osmaston (*Ibis*, 1925, p. 712) also found nests of this Plover in Ladakh, between 13,000 and 15,500 feet. He records it as not uncommon "in Rupshu near the Tso Kar and Tso Moriri Lakes as well as at Puga; also in the Indus Valley and around Shushal, as well as along the Pangong Lake. They frequent stony, sandy plains not far from water."

A series of the eggs sent to me were said to have been taken from "merely a slight excavation in sand and shingle, 100 yards from the river Indus and about 15 feet above water level"; a second from a slight saucer-like depression in sandy earth, among stones and shingle on a gently sloping bank, 60 yards from water"; while a third was found "in sand among stones, shingle and sand, 200 yards from a swamp and further from stream."

Hard-set eggs were taken on the 26th and 27th June and fresh eggs on the 2nd July, two lots of "freshly hatched young being found on the same date, while fresh eggs, incubated eggs and young were found between the end of June and the 9th July."

Ludlow (*Ibis*, 1928, p. 221) says that in the higher altitudes round Gyantse in Tibet they breed in May and June, being most abundant round the shores of the lakes but also on stony plains a long way from water.

As may be seen from the above, the breeding season lasts from the end of May (Gyantse) to the middle of July and the normal full clutch of eggs is always three.

In appearance the eggs are like very large eggs of *Charadrius hiaticula*, perhaps slightly less pyriform or peg-top shape.

The ground-colour is a pale stone-yellow, ranging up to rather rich bright reddish-buff. In one egg only, a single egg taken by Osmaston, is the ground tinted with pale sea-green. The markings consist of small specks and spots of blackish or deep red-brown and the more buff the ground the less black the spots. These are



NEST AND EGGS OF THE SPUR-WINGED PLOVER.
(Ramganga River, Bareilly, 4. 4. 32.)

scattered freely, but not thickly, all over the egg but are rather more numerous at the larger end. The secondary spots, hardly observable, are of grey.

Twenty-five eggs average 37.0×26.3 mm.: maxima 39.7×27.0 and 38.1×27.1 mm.; minima 35.4×26.0 and 36.5×25.1 mm.

Osmaston remarks that the birds show great solicitude for their eggs or young: "When there are eggs the female alone gives her alarm call, and runs to and fro in all directions. When there are young, both parents run and fly around and not infrequently simulate a wounded bird."

Subfamily VANELLINÆ.

LAPWINGS.

(2124) *Hoplopterus duvaucelli* (Lesson).

THE SPUR-WINGED PLOVER.

Hoplopterus ventralis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 164.

Hoplopterus duvaucelli, ibid. vol. viii, p. 696.

The Spur-winged Plover is found over nearly the whole of India as far West as the Central Provinces and United Provinces; it is common throughout Assam, Burma, the Indo-Chinese countries and South China. In the North-West it extends to the foot-hills of Garhwal and into the South of Kashmir.

This is another of our very common breeding birds whose haunts are entirely restricted to rivers with clear running water and with beds and banks of shingle, sand, boulders or rocks mixed with sand and pebbles. It prefers the bigger rivers and is very numerous in some places on the Narbudda, Jumna, Ganges and Brahmapootra rivers in India and the Chindwin and Irrawaddy in Burma. It is not, however, confined to these rivers. Inglis, Coltart and others record it as very common on the smaller rivers of Bihar so long as these are not muddy and I found it nesting on the tributaries of the Brahmapootra far up among the foot-hills.

In the Surrma Valley it only breeds on the Barak, Jiri, Jetinga etc., where these are rapid-running streams of bright clear water, with good beaches and islands of rock and shingle.

Hume thought it never bred on banks of pure sand but, though it may be exceptional, I have found several such nests, just depressions in sand, especially when this is to be found in small patches among rocks and boulders. Marshall also says that he found it breeding on sand-banks even among Terns and Swallow-Plovers, while Inglis and Coltart on the small rivers of Bihar found most of the nests were on sand-banks. They undoubtedly, however, prefer shingle to sand and, where they breed on banks composed of both, their scrapes will nearly always be found in the former.

In the hills I two or three times found the eggs deposited on shelves of rocks, while Hume says he took numerous eggs from tiny patches of sand "just big enough to hold the eggs in and about clusters of kunker rocks in the River Jumna."

I once found four eggs in the footprint of a tiger made on a pebbly sand-bank in the Diyung, while a still more unusual site is described by Mr. W. Bryson, who is quoted by Anderson to this effect:—"This nest I had great difficulty in finding, as the birds had taken possession of a ready-made depression in a melon-field where the seed had apparently failed; and they had actually lined the hollow, first with small bits of driftwood, and then with pieces of dry munj-grass. The bird returned to the nest immediately after I had taken the eggs, and so great was her disappointment that she scattered all the materials with her feet, occasionally picking up the straws with her bill and tossing them away with violent jerks of her head.

"On one occasion I found the eggs of this bird within a few inches of the water, in an angle of a half-burnt charpoy; the charred wood, clothes and skull were lying close to it."

The most unusual place, however, in which I have personally seen this bird's nest was in a mustard crop, fully 2 feet high and completely concealing nest and bird.

The breeding season has, of course, to be early in the year or all the young would be drowned in the June floods. Most birds breed in March and others in April, while I have taken eggs in February. On the Jumna at about 1,000 feet Osmaston obtained clutches in early May and Jesse took one clutch at Fategarh, in the United Provinces, on the 18th September, a most unusual date.

The eggs are nearly always four in number but threes are not uncommon and I have seen two clutches of five.

In colour the ground is pale stone-yellow or stone-ochre, pale dull grey-brown or grey-buff, rarely at all deep or bright. The markings are nearly always profuse, though not dense enough to obscure the ground, consisting of rather small blotches, spots and specks of various shades of brown and brown-black to black. The secondary marks are of lavender and grey, as a rule smaller and less conspicuous than the primary.

One or two clutches I have seen have had bold large blotches, chiefly at the larger end and sparse elsewhere, while a few others have had lines, hieroglyphics or smudges mixed with the other markings, but never numerous enough to dominate the character.

One hundred eggs average 41.1×29.4 mm.: maxima 46.1×30.0 and 42.0×31.2 mm.; minima 38.1×29.0 and 39.0×28.0 mm.

I believe incubation takes twenty-two to twenty-four days. Three eggs which I found on the 3rd March were increased to four and all four were hatched when I next saw the nest on the 28th. The chicks, though apparently only just hatched, could run with great speed but, when they found this insufficient for escape, they

lay crouched down in the small shingle and at once became almost indistinguishable from it. They kept their eyes tight shut for some minutes and then cautiously opened first one and then the other, both being at once shut again when they saw we were watching them. I picked up two but, while I was doing this, the other two scuttled off and I could not again find them. Both male and female flew round me uttering their loud calls as I looked for their babies, but settled down at once with the two left them. The female alone incubates but the cock bird stays near her much of the time on watch.

Lobivanellus indicus.

THE RED-WATTLED LAPWING.

(2125) *Lobivanellus indicus indicus* (Bodd.).

THE INDIAN RED-WATTLED LAPWING.

Lobivanellus indicus indicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 186.

The present race of Red-wattled Plover is found in Ceylon and over the whole of India except Sind, Mekran and British Baluchistan in the North-West and again Assam South of the Brahmapootra in the North-East. In the districts of Bengal East of the Bay we also find a bird nearer the Burmese than the Indian form. In the hills Hume says that it breeds at 3,000 to 4,000 feet but Jesse took a nest at Naukat-chia-Tal, Kuman, at 4,500 feet and Whympier has also taken its nest near Naini-Tal. In the Nilgiris they breed at still greater heights and Miss Cockburn says that they breed at Kotagherry, 5,500 feet, and at greater elevations.

Hume thus sums up the various sites selected by this bird for breeding purposes:—"They lay anywhere, provided there is water somewhere in the neighbourhood. Banks of rivers, edges of swamps or ponds, well-irrigated gardens, are their favourite nesting-sites until the rain falls; after the rains have well commenced they like drier situations. It is very usual to find their eggs amongst the ballast of a railway (often in such a situation that the foot-board of every carriage passes over the bird's head), or on the top of a hedge-bank, in an old brick-kiln, or in any well-drained situation; in fact, a pair that had frequented my garden all the cold season at Mynpooree laid on the top of my flat-roofed, two-storied house, and hatched their young there, and the second day had the young down in the garden. How they carried them down the forty feet from the parapet of the roof to the ground I could not ascertain. These particular eggs had been kept in their place on the flat roof by a circle of fair-sized pieces of mortar, heavy enough to resist the strong winds which often in Upper India usher in the rainy season. Very generally the eggs are laid in a simple depression in the earth, but not unfrequently the hollow is surrounded by

a little circle of stones or a little ridge of sand." He also writes:—"Going along the line to Etawah for about three miles on the 14th August we found five nests, one with perfectly fresh eggs. Four of these nests were on the kunker ballast within two feet of the rail, so that the footboards of every train must have passed over and within two feet of the sitting bird. The fifth was on the top of the boundary bank, the bird sitting totally unconcerned as our trolley passed within six or eight feet of it. Brooks tells me that along his fifty miles of line he has seen at least one hundred nests within the last twenty days or month."

Roofs of houses have often been found occupied by a pair of these birds and I was told of a pair which nested annually on the roof of an indigo factory. Their normal breeding site, however, in most places is a sand-bank in the bed or on the side of a river, where they scratch a hollow in the shingle or sand, often under the protection of a small bush or some tuft of grass, equisetum or other herbage. The nest may be a mere depression about six inches in diameter and from one to two deep. Generally it is unlined or merely with a bed of wind-blown scraps but, often, the birds line it neatly with pebbles, scraps of shells or other oddments while, still more often, they surround it with a tiny barricade of sand, stones or any other material which may lay handy. I have also found their eggs laid on ledges of quite bare rock but, nearly always, in some small depression which prevents their rolling about. In Bengal they occasionally nest in Mango-groves where the ground underneath the trees is bare and free from undergrowth.

Most birds breed in April, May and June but I have seen eggs taken in every month from February to October and, possibly, many birds breed twice, or even three times, in the year.

The number of eggs laid is four, sometimes three only and very rarely five. Perhaps one nest in several hundred may contain the latter and about one in twenty or more three eggs only.

The eggs are rather fragile for their size, like most Plovers' eggs. The texture is neither very fine nor very close and it is very rarely that the surface has any gloss. The shape ranges from pointed oval to pyriform.

In colour they vary very greatly. The majority have a greyish-ochre ground and it ranges from very pale bright creamy yellow to buff, buffish-brown or yellow-buff. Taking a series one would call their general tone dull ochre, while one or two clutches might show up here and there as rather olive-tinted. The markings vary as much as the ground. In most they consist of small blotches of a brown that is almost black, with underlying markings of grey. In some the blotches are much larger and these generally show some red-brown in them; such eggs are often very handsome, as the larger the blotches the fewer they are, as a rule, in number, and they then show up boldly against the pale ground. In many eggs there are a few lines, streaks and hieroglyphics as well as

blotches and in some these predominate and in others entirely replace the blotches and spots. I have one clutch with a bright ochre ground marked profusely with bold and fine twisted lines of black and many short whorls and short twists of the same. Another clutch has the ground a smoky buff-brown, almost obscured by blotches, lines and smudges of dull black, the secondary smudges showing as dull purple-brown if the eggs are examined with a glass.

One hundred eggs average 42.1×29.8 mm. : maxima 45.8×31.0 and 43.4×32.2 mm. ; minima 39.3×28.0 mm.

So far as I know the female only incubates, though the male generally stays near the nest and keeps a very bright look-out, giving a warning to the female, who generally sneaks away from the nest on foot, not rising until she has gone some distance. Both birds become very agitated if their nests are rifled and display many antics in the endeavour to entice the intruder from the vicinity of the nest or young. I have known both male and female fly away to a great distance when I have passed a nest without discovering it and, then, when I have retraced my steps and located it, they have *both* returned and simulated injury in their attempts to draw me away from it.

They often, especially when breeding in or near towns and villages, become very tame and bold and will not give up their nesting-site unless compelled to do so. Anderson notes how a Mr. Porcelli took four eggs of this species from a house-top on the 11th May, a second clutch of four about a fortnight after and a third clutch, this time of three, on the 18th June, these three eggs having been laid on the 9th, 13th and 18th June respectively.

(2126) *Lobivanellus indicus aignerii* (Laubm.).

THE MEKRAN RED-WATTLED LAPWING.

Lobivanellus indicus aignerii, Fauna B. I., Birds, 2nd ed. vol. vi, p. 188.

The range of this Plover apparently extends West from the Indus to the North-West Frontier, Sind, Mekran and Baluchistan. Ticehurst also records it from the Sambhur Lake in Rajputana. It also occurs in Mesopotamia and Afghanistan.

Though a very common breeding bird in Sind, this Plover seems never to be found in real desert country but requires water not far distant. Ticehurst summarizes its habitat thus (Ibis, 1923, p. 665):—"Throughout the length and breadth of Sind the Red-wattled Lapwing is common. Its only essential requirement is fresh water or swamps, or, at least, irrigated fields; hence wherever there is cultivation, or where some little trickle from a desert spring allows the neighbouring soil to maintain a certain amount of dampness, the inevitable pair or so of these birds will be found, while around wheels, canals etc. it is, of course, common. It is quite resident and not sociable, and each pair is jealous of its own terrain."

blotches and in some these predominate and in others entirely replace the blotches and spots. I have one clutch with a bright ochre ground marked profusely with bold and fine twisted lines of black and many short whorls and short twists of the same. Another clutch has the ground a smoky buff-brown, almost obscured by blotches, lines and smudges of dull black, the secondary smudges showing as dull purple-brown if the eggs are examined with a glass. One hundred eggs average 42.1×29.8 mm.; maxima 45.8×31.0 and 43.4×32.2 mm.; minima 39.3×28.0 mm.

So far as I know the female only incubates, though the male generally stays near the nest and keeps a very bright look-out, giving a warning to the female, who generally sneaks away from the nest on foot, not rising until she has gone some distance. Both birds become very agitated if their nests are rifled and display many antics in the endeavour to entice the intruder from the vicinity of the nest or young. I have known both male and female fly away to a great distance when I have passed a nest without discovering it and, then, when I have retraced my steps and located it, they have both returned and simulated injury in their attempts to draw me away from it.

They often, especially when breeding in or near towns and villages, become very tame and bold and will give up their nesting-site unless compelled to do so. Anderson notes how a Mr. Forcett took four eggs of this species from a house-top on the 11th May, a second clutch of four about a fortnight after and a third clutch, this time of three, on the 18th June, these three eggs having been laid on the 9th, 13th and 18th June respectively.

(2126) *Lobivanellus indicus agneri* (Leahm.).

THE MEKRAK RED-WATTLED LAPWING.

Lobivanellus indicus agneri, Fauna B. I., Birds, 2nd ed. vol. vi, p. 188.

The range of this Plover apparently extends West from the Indus to the North-West Frontier, Sind, Mekran and Baluchistan. Ticehurst also records it from the Sambhur Lake in Rajputana. It also occurs in Mesopotamia and Afghanistan. Though a very common breeding bird in Sind, this Plover seems never to be found in real desert country but requires water not far distant. Ticehurst summarizes its habitat thus (Ibis, 1923, p. 665):—"Throughout the length and breadth of Sind the Red-wattled Lapwing is common. Its only essential requirement is fresh water or swamps, or, at least, irrigated fields; hence wherever there is cultivation, or where some little trickle from a desert spring allows the neighbouring soil to maintain a certain amount of dampness, the inevitable pair or so of these birds will be found, while around 'heels, canals etc. it is, of course, common. It is quite resident and not sociable, and each pair is jealous of its own terrain."

K. R. Eates says that it is a very common breeding bird in and on the Habb River and he took a very fine series of its eggs on sand-banks, shingle beds, etc. in the semi-dried stream and also on the sides of the river both close by and a little distance from it.

Occasionally its nest may be found in swamps, on some piece of sun-burnt mud, higher than the surrounding wet mud and water.

Scrope Doig took its eggs from March to the end of July while Eates obtained them in April, May and June and, in Afghanistan, Barnes took a clutch of four eggs on the 10th May. At Thull, on the N.W. Frontier, Rattray found it common and took several nests while Marshall and Williams both found it at Quetta, all these in May and June.

The full clutch, is of course, four as with nearly all the Lapwings and they are indistinguishable from those of the Indian race, but the series I have seen have not nearly so great a range of variation and do not seem often to have either lines or hieroglyphics mixed with the blotches.

Fifty eggs average 42.4×30.4 mm. (like the bird, just a trifle bigger than *indicus*): maxima 46.2×30.2 and 45.0×32.0 mm.; minima 38.5×30.1 and 42.3×29.3 mm.

According to Ticehurst both sexes incubate but this is not so, I believe, with the other races.

(2127) *Lobivanellus indicus atronuchalis* Blyth.

THE BURMESE RED-WATTLED LAPWING.

Lobivanellus indicus atronuchalis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 189.

This form of Red-wattled Lapwing is found in the Surrma Valley in Assam, Manipur, the districts of Bengal, East of the Bay of that name, and all Burma through the Malay States to Sumatra and East through nearly all the Indo-Chinese countries.

Except that this is a wilder bird, keeping away from buildings, towns and villages and breeding more exclusively in river-beds, there is little one can say about its breeding which is not equally applicable to the two preceding races. I obtained them up to an elevation of some 1,500 to 2,000 feet in the Barail Range in Assam while Harington, Mackenzie, Grant and Hopwood obtained them in the Chin and Kachin Hills and Shan States up to about 4,000 feet or rather higher. In Burma they are said often to breed in dry rice cultivation, especially in burnt stubble, where the eggs are extraordinarily hard to detect, as their buff ground, spotted with black, is exactly like the semi-charred bits of rice-stalk in which they lay. I have twice found their nests in curious positions. Once when following up the old tracks of an enormous tiger, afterwards killed by Mr. W. Peddie, over a long low bank of sand and shingle, one of these birds got up ahead of me and ran away.

Following up, I found three hard-set eggs laid in one of the tracks. Here there was mixed sand and shingle with a thin growth of wiry grass, a kind of resort much affected by these Plovers. On another occasion I found four eggs on the upper surface of a large semi-rotten log lying in among some drift left by the receding water on a sand-bank in the Diyung River.

March and April are possibly the months in which most eggs are laid, especially in rivers which are liable to early floods, but everywhere they seem to lay often as late as June. Harington obtained eggs at Myingyan from the 17th March to 9th June; Graut took them at Popa up to June. Davison found an egg in Tenasserim on the 10th March, where Mackenzie took fresh eggs on the 20th June. In Assam I have myself taken them from March to the 22nd July, but here, undoubtedly, most eggs were laid in April.

As usual, this Plover lays four eggs, but three only seems to be less rare with the Burmese race than with the Indian or Sind bird.

The eggs exactly resemble those of the other subspecies but, as a series, may average a little darker, perhaps on account of the darker ground selected as laying sites in Burma.

Forty-eight eggs average 41.5×29.8 mm.: maxima 45.4×30.1 and 45.0×31.1 mm.; minima 40.1×28.4 and 40.4×28.1 mm.

(2128) *Lobipluvia malabarica* (Boddaert).

THE YELLOW-WATTLED LAPWING.

Lobipluvia malabarica, Fauna B. I., Birds, 2nd ed. vol. vi, p. 190.

The Yellow-wattled Lapwing breeds over the greater part of India and in Ceylon. It is not found in the North-West Trans-Indus nor in Lower Sind, while in the North-East it does not extend to Assam but has been recorded from the 24th Parganas and from Dacca.

Except that it does not seem necessary for water to be near, this Plover breeds in much the same sort of places as the Red-wattled bird does, but very seldom on river-banks or on sand or shingle beds in rivers. Most birds probably prefer ploughed fields, muddy shores of lakes, swamps and rivers or waste lands on which to breed. If on shores these may be dry, sun-baked, stony or other wise, and the eggs are never laid on damp ground and very seldom close to the water. In the South of India, especially in Travancore, where it is extraordinarily common, it seems to generally select these sun-baked mud shores of tanks and swamps, while in Northern India it most often lays in dry upland wastes, abandoned cultivation or ploughed fields. One place in Travancore where they breed in great numbers is the very barren, rocky strip of laterite soil which runs South parallel to the sea. Here there is but little soil on which any growth can take root. In odd places is a certain amount

of stunted grass, here and there a few weeds or scrubby bushes may find a foothold in crevices and faults but, for the most part, the ground is just a red rocky strip, covered with black chips of ironstone and, only after the rains break, affording small areas where the few villagers can raise a meagre crop. Here the birds breed in great numbers, making their nests in any natural hollow in the rock, for the most part without lining other than casual wind-blown scraps but, occasionally, with a slight lining of grass. Protection by tufts of grass, a bush, or protecting boulder or rock is sometimes sought but, generally, they are fully exposed to sun, wind or rain.

On waste lands in Upper India much the same kind of nest serves the purpose, though here the birds seem more often to prepare their own scrape rather than select a natural depression.

The breeding season, generally speaking, is April, May and June. Around Cawnpore Marshall found nests in April, all in ploughed fields. In Travancore Bourdillon found them breeding from 3rd March to 13th August and Stewart from the 4th April to the 6th August, while Davidson and Wenden obtained them in Khandesh in December, January and February and again in July and August.

The full clutch is generally four but very often only three eggs are laid.

The normal colouring of the eggs of this bird is much the same as that of the Red-wattled birds, though they are much smaller, but there is a fine erythristic type to which special reference must be made, as I know of no other example in oology of adaptation quite the same as in this case. I wrote a long note on these erythristic eggs in the Bombay Journal (Journ. Bomb. Nat. Hist. Soc. vol. xxxv, p. 250, 1931), but the case is one of such great interest and, I think, of importance, that no excuse seems to be needed for repeating it here. The discovery is due entirely to Mr. J. Stewart, and the *résumé* here is really taken from his many interesting letters on the subject. It is true Davidson first found a clutch of these wonderful red eggs but did not place much importance on their colour, though later, when I asked him where they were found, he told me that they had come from an outcrop of red laterite, apparently the extreme Northern end of the strip I have referred to as occurring in Travancore. Stewart in describing this strip to me said that, roughly speaking, the whole of it looked as if composed of broken red brick, the surface scattered everywhere with tiny to medium-sized nodules of black ironstone. In 1915 Stewart worked the black soil country alongside the laterite for these Plovers' eggs and on a small patch of red laterite he took one clutch of these erythristic eggs which he kindly sent home to me. The following year, at my urgent request, he deputed men to work especially on the red laterite and, though they found very few sets, all those on the red laterite were of the erythristic type. Stewart, however, said the bird was common and that when his and his men's eyes had got better trained

to the work he would find more. This proved to be the case, and in succeeding years Stewart and his men got a wonderful series. In one of his letters to me he says that practically every clutch found on the laterite was red and practically every clutch taken on the adjoining black soil was normal in colour. In the very rare cases where they found this not to be the case the eggs showed up in such contrast to their surroundings that eventually they must have been detected by vermin and destroyed.

The erythristic eggs have a ground varying from creamy red to deep brick-red or salmon-red profusely spotted and blotched with black or deep red-brown. The markings vary in distribution in much the same degree and character as in the normal type, but capped eggs, or eggs with very large blotches, are sometimes met with.

To me this appears to be a very remarkable example of adaptation to surroundings, *i. e.*, environmental selection. Presumably the first Plovers laying on the red strip laid eggs which were normal, but they were so conspicuous that the only ones which escaped destruction were a few with a ground-colour somewhat less in contrast to their surroundings than the rest. As each generation appeared and produced eggs this selection would continue and those eggs most like red laterite in appearance would escape detection and those most unlike be destroyed until, in course of time, the erythristic egg-laying Plover became stabilized on this particular tract of country.

In shape, texture and size the two forms of eggs agree exactly.

Two hundred eggs average 36.4×26.9 mm.; maxima 42.8×26.0 and 37.0×28.5 mm.; minima 32.0×24.4 mm.

Himantopus himantopus (Linn.).

THE STILT.

(2130) Himantopus himantopus himantopus (Linn.).

THE STILT.

Himantopus himantopus himantopus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 193.

The Stilt is a resident breeding bird in Ceylon, the greater part of India, Burma and the Malay States, while it has been recorded from as far East as Annam (Delacour). Outside India it also breeds over the greater part of Southern Europe, Asia to Mesopotamia and Northern Africa.

Wherever there are suitable swamps or shallow lakes in India these long-legged birds may be found breeding. In Burma they are not so common but they breed in several places, and they have also been found breeding in the Malay States. In former times they bred in great numbers on the Sultanpoor salt-works about

35 miles South of Delhi. The birds were present round about these works throughout the year, but about April other birds also arrived and they began to congregate in great numbers. Hume gives the following description of their breeding here. The "works consist of brine wells and many hundreds of acres of shallow, rectangular evaporating pans from 100 to 200 feet square and from 6 to 10 inches deep. These pans are merely depressions dug in the soil and lined with *chunam* or fine lime, obtained by burning kunker, a limestone found in beds near the surface more or less throughout the plains of Upper India. Small strips of ground from a foot to 5 or 6 feet broad divide the pans, and on the margins of these, or even in the beds of disused pans, where only a little brine ever stands, the Stilts build their nests.

"They collect together small pieces of kunker, or the broken lime-lining of the pans, into a circular platform from seven to even twelve inches in diameter and from two to three inches in height; on this again they place a little dry grass, on which they usually lay four eggs, but not unfrequently only two or three."

"The birds have their choice of site. Not one nest was found in two successive seasons at Balpoor or Kaliawas; very few at Sultanpoor. On the other hand, at Moobarikpoor (all the works are exact *facsimiles* one of the other) the nests were at some places crowded to an inconceivable degree. On one strip, about 3 feet wide and 100 feet long, there were twenty-seven nests on one margin and eleven on the other, besides five nests of the Red-wattled Plover."

A more normal breeding place is one described by Pitman as having been seen by him in the Euphrates Valley. Here they were breeding in vast marshes in company with *Chettusia leucura* and Terns of several species. In one of his letters he writes: "Yesterday I found about 60 nests of the Stilt, most of them with full clutches of three or four eggs. The nests varied greatly; the majority were mounds of weeds, grass, rush-stalks and other vegetation, with a depression at the top for the eggs. One or two of these nests were over two feet high from top to bottom, quite massive affairs, and one would have thought they were so built by the birds to enable their long legs to be comfortable; other nests, however, were nothing more than hollows in the mud, yet the sitting birds seemed equally comfortable. On some of the little islands several nests were built close together and in other places scattered, in twos and threes or singly, here and there over a wide area."

H. W. Waite found a colony of these birds breeding at an elevation of 2,100 feet on the Kallar Kahar Lake on the Salt Range (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 838, 1923). They must have been numerous, as he records that on one day a villager collected sixty eggs, while he also found several other nests himself.

He writes : "The lake lies under the northern slopes of the Salt Range and its waters are distinctly salt. It is roughly circular and is nearly a mile across when full, its greatest depth being then about 4 feet. Occasionally, in years of drought, it dries up completely.

"I arrived on the lake on the 26th June and on the same evening found a Stilt's nest containing two eggs. On the 9th July I found two more nests, from which I took 2 fresh eggs and 4 showing slight signs of incubation. Both these nests were on the outer edge of a wide belt of reedy grass from two to three feet high fringing the East end of the lake. They consisted of a kind of weedy scum collected and built up, with a small reed clump for foundation, to a height of about 3 inches above the water, there some 6 inches deep. The little mounds were 8 or 9 inches in diameter and the eggs were lying on them in a shallow depression lined with a few bits of grass. The whole mass was saturated with water, and pieces of the grass lining adhered to the eggs when they were taken from it."

He adds that in some places "where small mounds showed above the surface of the water some of these had been utilized in preference to making heaps of scum."

Waite's description of the nests, mounds of weeds etc. and natural little mounds of mud answer well to the two types of nests generally made or used by the birds, the third or less common type being the shallow depression in flat ground.

Everywhere June and July seem to be the two months in which most eggs are laid. At the salt-works Hume records that they "begin to lay, according to season, towards the end of April or beginning of May. The majority of birds lay during June," and he adds that the temperature of a nest at that time probably averages about 140° Fahrenheit. Doig also found them breeding in Sind during June and Macdonald obtained a nest with four fresh eggs on the 1st June at Kanna tank near Myingyan, Upper Burma.

In Ceylon, where W. E. Wait found them breeding on the Palutapanie Lagoon on small grassy mounds, most eggs were hard-set on the 18th April but Legge found fresh eggs on the Minneri and Kandelay tanks in August.

The number of eggs laid is three or four, perhaps most often four, rarely two or five.

In shape the eggs are rather long, pointed ovals, the texture finer than in the eggs of the Lapwings, the surface smooth and often glossy and the shell much stronger.

The ground-colour varies from greenish-brown, yellow-brown or buffy brown to pure pale but rich brown, the green tinge, when present, nearly always fading away after a few weeks or months. They are marked with spots, specks and blotches of brown, blackish-brown or black, rarely intermingled with a few streaks. Secondary markings are not always present, but are grey when they can be seen.

One hundred Indian eggs average 44.0×31.0^1 mm.: maxima 48.2×33.0 mm.; minima 38.8×28.0 mm.

There is very little difference in size between European, Mesopotamian and Indian eggs and none in colour.

Witherby records that the Stilts are single-brooded but that there is no information available about duration of incubation.

(2132) *Ibidorhyncha struthersii* Gould.

THE IBIS-BILL.

Ibidorhyncha struthersii, Fauna B. I., Birds, 2nd ed. vol. vi, p. 196.

This curious bird breeds from the Pamirs and Gilgit through Ladak and Tibet to North-West China at elevations of 8,000 feet upwards to 15,000 feet and possibly higher, many birds, according to Ludlow, remaining at 12,000 feet or more during the whole Winter on the Gyantse plain.

These birds seem to keep during the nesting season entirely to the islands and banks of streams of some size where there are beds of shingle upon which they breed.

Whympers and Bailey both found this bird breeding in 1906, Whympers, I believe, being the first of the two by just over a month. Both records, however, appeared simultaneously (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 546, 1906). Whympers notes: "On May 5, 1906, I found the Ibis-Bill (*Ibidorhynchos struthersii*) breeding on the Bhaghirathi at about 8,000 feet. I got three clutches of eggs, four in each, there being, so far as I could make out, only three pairs of birds there. The nests, composed of small stones, were hollowed out and placed on sand and shingle among boulders and were like very large nests of the Spur-winged Plover. I found two of the nests by watching the birds, but the first one I found by taking back the tracks of a bird that was crouching and running along in this manner and at once flew back when flushed. I had to trace the tracks back well over 100 yards before I came to a well-trampled spot, and the eggs were at the side of it.

"I sat down some way off to watch and the bird returned in about five minutes (the eggs were very hard set), running almost straight to the nest and stood over it, bobbing her head like a Plover. She then sat down alongside the eggs, not actually on them, and this seems to be a habit of theirs, as I saw another bird act in the same way on returning to the nest."

Next, on the same page, Bailey records his find:—"The nest was found in a stony island in the middle of the river here (13,000 feet). The nest was made of small flat stones about $\frac{1}{2}$ inch in diameter, forming a smooth and perfectly flat surface. I unfortunately did not measure the nest. The eggs, four in number, were laid with their points inward. This was taken on 9th June,

when the eggs were hard set. On the same day I saw two birds, each with two young ones. On my approaching, the young birds lay among the stones with their necks stretched out flat on the ground while the old birds tried to draw me off in another direction, uttering loud cries. The young when crouching among the stones were difficult to see, and lay so still they allowed themselves to be picked up before showing any signs of life."

In subsequent years Whympers found more nests in the Bhaghirathi, of which he says (*ibid.* vol. xx, p. 519, 1910): "The river runs in several branches and with no great fall, in a wide valley and among large shingle-beds, and on these the *Ibidorhynchus* breeds.

"They are especially fond of nesting in these little islands, which are numerous and sometimes rather hard to get at; the nest is always placed right in the open; I never saw one under the shelter of a stone or stranded log as mentioned in the 'Birds of India,' a common site is near the edge of a shingle bank. The nest is easily found by keeping a sharp look-out ahead, and the bird will be seen running stealthily away; if the nest is not then immediately discovered the bird will return to it in a short time. I found fourteen nests in a few days; the eggs were mostly well incubated, although I was a fortnight earlier than in 1906. In four nests I found incubated clutches of three eggs, so it seems they sometimes lay three only. The nests have already been described; all I saw were made, as before, of little smooth black stones.

"The whole breeding ground is only about 10 miles long and is easily reached, being merely the river-bed."

Ludlow makes an interesting addition to this information (*Ibis*, 1928, p. 221):—"The bird breeds in shingly river-beds, generally where the river bifurcates, forming an island.

"The nest seems always to be placed on high ridges on the island, and it is no use looking for it on low ground, where mud on the shingle shows that it is liable to be flooded. The eggs, four in number, are laid in a shallow depression amongst very small pebbles, which the parent birds evidently take pains to collect. On two occasions I discovered the bird sitting on its nest, and on each occasion it allowed me to approach within four or five yards before it rose and walked quietly away."

The difference of the behaviour of the birds in Tibet and those in Garhwal is very curious and difficult to account for. Ludlow's eggs were taken in the third week of April at, I believe, between 12,500 and 14,000 feet, while Macdonald sent me eggs taken near Gyantse at the same elevation in May and June and, finally, La Touche had the eggs brought to him by one of his collectors in Chihli and then himself found numerous nests on the 2nd May, giving a description of eggs, nests and sites agreeing very closely with those recorded above.

It will be seen that, in spite of its lofty habitat, the Ibis-Bill is a very early breeder, some birds laying in the latter half of April, most in May and but a few in June.

The eggs number four or three, only about one nest in every four having the latter number.

The eggs remind one more of Woodcock's eggs than of any others but are very pale and rather washed out in appearance. The ground-colour is a very pale grey, tinted with greenish, yellowish or buff, the tint always very faint and indeterminate. The markings consist of pale or moderately dark reddish blotches, generally rather small, fairly numerous at the larger end but sparse elsewhere. The secondary markings, of the same character and equally sparse, are of pale grey. In one of La Touche's sets taken in Chihli the markings are much darker, of deep red-brown rather than red.

In shape the eggs are rather broad ovals, not as broad as those of the Woodcock, and rather less pointed also. The texture is fine and close while the surface has a fair gloss, but the shell is fragile in proportion to its size.

Fifty-two eggs average 51.0×36.9 mm. : maxima 53.0×36.0 and 50.3×38.0 mm. ; minima 46.0×34.0 mm.

Family SCOLOPACIDÆ.

Subfamily TRINGINÆ.

(CURLEWS, GODWITS, SANDPIPERS, RUFFS.)

(2145) *Tringa hypoleucos* Linn.

THE COMMON SANDPIPER.

Tringa hypoleucos, Fauna B. I., Birds, 2nd ed. vol. vi, p. 217.

The Common Sandpiper breeds throughout the greater part of Europe, the whole of Northern Asia East to Japan and South to the Himalayas.

In the Himalayas it is a common breeding bird in Kashmir, Garhwal and Tibet.

South of the Himalayas the only record of this bird's breeding is that of Scrope Doig ('Stray Feathers,' vol. ix, p. 282, 1880), who says that a nest with two eggs were found by his collector in the East Narra District. As Ticehurst shows (Ibis, 1924, p. 124), this record cannot be accepted, and there is no proof that it ever breeds under 5,000 feet.

It is a very common bird in Summer in Kashmir from 9,000 feet upwards and rather less common down to 6,000 feet but, recently, Bates and Livesey found the birds breeding in great numbers on the lakes near Srinagar at 5,000 feet and a little over.

Brooks and Cock took nests long ago in Kashmir and the latter writes: "I found the Common Sandpiper breeding plentifully on the banks of all the streams that run into the Cashmere Valley, and took many nests on the Sindh River in May and June.

"The nest is placed a few yards from the water in an open situation in stony localities among low sage-bushes. It is on the ground in a slight depression, generally to the north of a low bush, and consists of a few little pieces of stick or a few fragments of dead leaves. It always contains four eggs, the pointed ends of which are placed together in the centre. The bird gets off the nest very slowly as if it wished to attract attention to itself."

Both in Kashmir and in Garwhal, where Whympers took several nests, the birds generally make them close to, or actually on, the banks of rivers and streams, but they are almost invariably well hidden in a hollow among the roots of the bushes and other vegetation, or even in a hole under an overhanging bank or large boulder. Occasionally, however, they are placed in a comparatively exposed position. Bates found one nest under a large boulder, protected fairly well from the weather but easy to see and find, while Whympers obtained two nests on the Baghirathi River which were on open shingle beds, just depressions in the shingle lined with bents. Wherever it is placed there always seems to be a good lining of grass or leaves though, when placed in among the roots of grass, this is beaten down and twisted to form the lining and no new material brought in.

Often they will build their nests in hollows among the small bushes or lush grass growing round the lake-shores, where Livesey and Bates took many nests, while, at other times, they breed far away from either rivers or lakes.

Col. K. Buchanan informed me that he took several nests in Kashmir in well-wooded ravines, where they were cleverly concealed among bushes, or completely hidden under some boulder or overhanging rock. At the bottom of the ravine there was generally a certain amount of water trickling down, drainage from the surrounding high ground.

The breeding season is exceptionally well defined and the birds are most regular in their breeding time. Nine clutches out of every ten will be found to be laid between the 15th May and the end of June. Occasionally a late clutch, probably a second laying by birds which have lost their first clutch, may be found in July, while Ward's collectors took four fresh eggs on the Sindh River on the 8th August. The earliest date I have noted is the 9th May, when a clutch of four eggs was taken by Whympers on the Harsil River in Garwhal.

As with all other Waders of this genus, four is the normal number of eggs laid but, in 1907, Buchanan had an extraordinary experience with this bird. When his collection was dispersed I obtained his series of Indian-taken eggs of this bird and was surprised to find clutches of five and six eggs. On my writing to him about this he replied: "I did not know there was anything strange about this Sandpiper laying five or six eggs. It is never a rare bird in Kashmir but this year in Pahlgaon it was extraordinarily common and I took many nests. Three of these each contained six eggs and there were several with five although, of course, the great majority had only four. The nests and eggs were always very well hidden or I should doubtless have found many more. I took nests from the third week in May to the end of June."

In ground-colour they vary from pale creamy buff or yellowish-stone to a warm buff or reddish-buff. Normally they are fairly thickly spotted, especially at the larger end, with small spots, blotches and specks of reddish-brown and umber-brown with secondary similar markings of pale grey or pinkish-grey. In some eggs the blotches are larger and bolder but, taking a series, I do not think they are so well marked as many eggs of other Waders, and a really boldly marked, handsome clutch is quite exceptional. I have seen a few clutches, taken in India, in which the markings consisted of twisted lines intermingled with bold blotches, nearly all confined to the larger end. Occasionally the markings are rather cloudy and smudgy in their appearance, the primary and secondary blotches running into one another and giving a very pretty effect. Pigmentless eggs seem rare in this genus compared with the number one finds in *Charadrius*.

The shape is the usual peg-top of most small Waders, often rather drawn out; the texture is fine and close and the surface often well glossed and the shell strong.

One hundred and twenty eggs taken in India average 35.6×26.2 mm.; maxima 38.9×26.9 and 35.5×27.2 mm.; minima 32.1×26.3 and 32.2×24.1 mm.

Both parents take a share in incubation, the female doing most of this by day. Incubation in Europe is said to take twenty-one to twenty-four days but the only record for India gives twenty days from the date of the laying of the last egg. The birds sit very close as a rule, but individuals seem to differ greatly in this respect; some quit while one is still far from the nest while others wait until they are almost trodden on.

Tringa totanus.**THE REDSHANK.**(2147) **Tringa totanus totanus** * Linn.**THE REDSHANK.***Tringa totanus totanus*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 221.

The Redshank is found as a breeding bird throughout the greater part of Europe and in Asia East to Japan and South to the Himalayas in India but, possibly, not breeding in some of the central portions of Central Eastern Asia, where Meinertzhagen's *terrignotæ* may be the breeding form.

In view of the alleged doubtful status of our Indian bird I restrict my notes to birds, nests and eggs found in Asia.

The Redshank was not known to breed within Indian limits in Hume's time and the first nests taken were probably those collected by Crump for Whymper and Ward in 1906 near Chusal, in Ladak, at about 14,000 feet, curiously enough a clutch of five eggs, obviously laid by the same bird.

Steen, Kennedy, Macdonald and Ludlow also obtained it breeding in Tibet and I have some clutches collected by Macdonald near the Hramtso Lake, where Ludlow says (Ibis, 1928, p. 223) that it is exceedingly common. Ludlow also found it very numerous in Chinese Turkestan, where he took many clutches, while in 1923 Osmaston also obtained breeding birds and eggs in Ladak near Shushal at 14,200 feet.

Here Osmaston found them breeding in an extensive swamp of reeds and rushes, placing the nest in tufts of grass in the swamp. At Hramtso Macdonald also said the bird was common, but the nests so well hidden that they were hard to find. They were all placed in tufts of the thin wiry grass which grew sparsely scattered over the sun-baked mud, "hard as bricks," above the normal water-line of the lake. Ludlow, writing of the same place, says that "it constructs its nest either on sedgy hillocks in marshy ground, or on grassy islands in the lakes. The nest is often a hollow scraped in the ground lined with a few pieces of dry grass."

In Turkestan Ludlow found them breeding in May and obtained all his eggs between the 5th and 15th of that month. In Tibet and Ladak, however, they appear to breed later and all the eggs

* It is still a matter of opinion as to whether the Eastern race of Redshank can be separated from the Western. Ticehurst (Ibis, 1924, p. 120) is satisfied that its paler tone is enough to distinguish the Eastern bird. Meinertzhagen, Kinnear and Ludlow are unable to see any differences and the latter has recently acquired breeding specimens in Chinese Turkestan. Under these circumstances I adhere to the opinion I gave in 1929 and keep both Eastern and Western birds under the same name.

sent to me have been taken between the 1st June and the 24th July except one clutch taken on the 13th May.

The number of eggs in a clutch is four but Crump once took five eggs and Whympere took two clutches of three showing signs of incubation.

In appearance they naturally do not differ in any way from eggs of European birds but with only a small series for examination the range of variation is not so great. In shape they are long pyriform and the texture is fairly fine, not very close, the shell fragile and the surface glossless, slightly or moderately glossed.

The ground-colour in all the Indian eggs is a yellow stone, sometimes more yellow, sometimes more buff, sometimes slightly warmer, but never the rich deep buff or bright yellow-white one sometimes seen in English eggs. The markings consist of small and moderately large blotches of deep red-brown, blackish-brown or purple-brown, usually more numerous at the larger end than elsewhere and sometimes running into one another and forming ill-defined rings or caps. A few eggs have the blotches more uniformly and heavily distributed and a few others have lines, smudges and streaks mixed with the blotches, but the lines are never conspicuous. The secondary blotches of grey are generally few in number but occasionally are sufficiently prominent to give a softening tone to the general colour.

Sixty Asiatic-taken eggs average 44.3×30.4 mm.: maxima 48.2×31.0 and 46.5×33.1 mm.; minima 41.1×29.0 mm.

In Europe both sexes incubate though the female may do most of the work. According to Witherby the period of incubation is twenty-three to twenty-five days. The birds are very shy sitters and leave the nest long before an intruder gets anywhere near it. In driving rain or mist it is possible to get very close to them by walking against the wind and in this way I have walked up to within a few feet of sitting birds again and again, though on a sunny or still day the birds would leave their nests so far away that it was difficult to locate the place whence they rose.

(2151) *Glottis guttifer* (Nordmann).

THE YELLOW-LEGGED SANDPIPER.

Glottis guttifer, Fauna B. I., Birds, 2nd ed. vol. vi, p. 226.

The breeding range of this bird is not really known but is possibly somewhere in North-Eastern Siberia.

The only notes on its breeding are my own (Journ. Bomb. Nat. Hist. Soc. vol. xxxvi, p. 305, 1933) to the following effect:—"Eggs authentic beyond all doubt have not yet been taken. In 1909 Captain Steen took a single egg which he attributed to a Greenshank, the slightly upturned bill attracting his attention. In 1910 a full

clutch of four eggs was taken from a nest on a ridge a little way from the lake (Hramtso) on which some stunted grass and a little Tibetan gorse were growing. This bird was shot and identified as 'a Greenshank with yellow legs' but the skin was lost. Finally, in 1917 a single egg was sent me by Macdonald with remnants of a skin sufficient to show by its bill and legs that it was of the present species. This egg was 'taken from a neatly lined hollow in among some moss (? Sphagnum) and stunted grass and we could see the eggs as the bird moved off.'

"The eggs are like large eggs of the Redshank or small ones of the Greenshank. The ground in all is a rather dull buff, in one more stone-colour, and they are all rather handsomely blotched with deep reddish-black or blood-red. The blotches are large, some of them very large, interspersed with smaller blotches, spots and specks of the same colours; they are fairly numerous everywhere but more so at the larger than the smaller end. Their texture is rather coarse and they have no gloss; they are in shape of the usual peg-top, pointed type common to the Waders.

"Six eggs average 47.9×33.0 mm.; maxima 49.2×36.6 mm.; minima 46.4×34.3 and 47.4×31.3 mm.

"The eggs were taken on the 16th and 29th May and 3rd June respectively."

Subfamily SCOLOPACINÆ.

(WOODCOCKS and SNIPES.)

Scolopax rusticola.

THE WOODCOCK.

(2167) *Scolopax rusticola rusticola* Linn.

THE WOODCOCK.

Scolopax rusticola rusticola, Fauna B. I., Birds, 2nd ed. vol. vi, p. 252.

Within our limits the Woodcock breeds not uncommonly in the Himalayas from the North-West Frontier to Western China. Outside these limits it breeds practically throughout Northern and Central Europe and Northern and Central Asia.

In the Himalayas it breeds from about 7,000 feet up to at least 12,000 feet and probably considerably higher.

In Hume's time very little had been recorded about the breeding of the Woodcock in the Himalayas, and his only notes refer to the finding of four hard-set eggs by Anderson near Kemo, at an elevation of over 10,000 feet, on the 30th June. Since then many collectors have taken their eggs and Rattray's beautiful photographs of the

nests and their surroundings are in themselves a lesson on the breeding of the Woodcock.

I think the Woodcock must have a wonderful æsthetic taste, for so many of the nests are placed in most charming surroundings. The nests may be found in almost any kind of forest, though the birds prefer Oak and Beech cover or forest in which these and other trees are mixed. Rhododendrons again seem to be favourites and Osmaston, Whymper and others have found their nests placed under them. The birds often select damp or even wet pieces of woodland to breed in, but for the nest they always choose a dry spot. Ravines which are thickly wooded and which have a dense undergrowth of ferns, bracken, brambles etc. and which have water trickling along the bottoms, widening out here and there into small patches of sodden moss and grass, are often resorted to. In some tiny open space, well littered with *dry* fallen leaves and completely screened by the growing vegetation, whatever that may be, the bird scratches out a hollow among the leaves for her eggs, leaving enough of these at the same time to form a soft dry bed. I have never seen eggs resting on the ground nor have I, personally, taken eggs from wet nests, though sometimes I have seen everything soaking wet above and below them. This is not, however, always the case and Anderson says of the eggs taken by him: "Four eggs, which were deposited in a slight depression in the damp soil, and embedded amongst a lot of wet leaves, the thin ends pointing inwards and downwards into the ground."

Where there is bracken growing the nest is often placed under it, the nest itself being no more than a hollow, natural or made by the birds, warmly filled with scraps of the dried and withered bracken of the previous year. It is difficult to give the measurements of the hollows used for the eggs as, being among dead leaves and rubbish, they have never any definite outline but, roughly speaking, they may be six to eight inches across and half an inch to one inch deep.

Round about Murree, where Rattray took many eggs, the birds breed from early May to late July; in Kashmir from late May to July; in Garhwal, where Whymper took several nests up to 11,000 feet, June is the principal month, though Osmaston obtained eggs at Chakrata at 8,500 feet on the 1st May and also at Darjiling, 11,500 feet, on the 29th of that month.

The full clutch is almost invariably four, though Livesey obtained three in Kashmir showing signs of incubation.

In shape the eggs are blunt ovals, sometimes rather pointed at the smaller end. The texture is finer than in the eggs of *Tringa totanus* or *Capella* and closer together, while the surface often has a fine gloss. In proportion to their size the eggs of the Woodcock are much less fragile than those of the Snipes.

The ground-colour ranges from a very pale creamy or yellowish-white to a warm buff or, very rarely, to a reddish *café-au-lait*.

The markings consists of large and small blotches, sometimes well defined, at other times rather blurred, of dull reddish or reddish-brown to dark red-brown. As a rule these are fairly numerous at the larger end and scant elsewhere, though in some eggs they are numerous everywhere. The secondary markings are of lavender, grey or sepia-grey, and often form clouds and mottling, especially at the larger end, where they are often more numerous than the primary blotches. Occasionally the markings are more numerous at the extreme larger end but I have never seen an Indian egg in which there was a definite zone or cap.

Fifty-five Indian eggs average 44.5×33.3 mm. : maxima 48.1×33.2 and 45.3×34.3 mm. ; minima 42.0×32.0 and 44.5×31.7 mm.

Both sexes incubate and both look after the young. The display of the Woodcock during and before the breeding season is known as *rôding*.

A gamekeeper in Wales gave me a better description of the *rôding* than any I have read. He told me that just before dusk the bird came out of the cover and sailed slowly backwards and forwards in front of it. At first the flights were high but gradually the birds got lower and lower until, reaching the level of the scrub, they disappeared into it. Each flight was said to be in the shape of a long arc, the highest points being reached at its end and commencement, while in length they were anything from fifty to two hundred yards or more. The bird was described as flying slowly with plumage puffed out, head thrown back and bill pointed somewhat upwards. I unfortunately did not inquire how long their nuptial flights lasted, but the impression I gained was that the flights were numerous and lasted for a long time. Lindsey Smith says of birds he watched when *rôding* near Danga Gali that, while thus engaged, the birds uttered "a rather harsh croak, alternating with a sharp whistle or squeak, something like that of a bat, but very much stronger."

Another habit of the Woodcock which must be referred to is that of carrying its young from one place to another, the chicks being carried between the legs and held close to the breast by the feet. This action is resorted to both to escape danger and to transfer the young to new feeding grounds.

Although this act was long disbelieved, it has now been well authenticated, and the "yokel's yarn" proved to be true. In India not many have observed this performance, but Davidson has a brief note on it:—"On the 28th of May I found a pair with small young ones and distinctly saw one of the old birds carrying a young one between its feet or legs. It flew only some 50 yards but, though I followed at once, I not only failed to find the young bird but could not even put up the old one again, and on returning could not find the young one that I had previously noticed on the ground."

Littledale records a similar occurrence, and another friend writes from Scotland and says that he believes he has several times seen the chicks carried and that once he has certainly done so. "On

this occasion we came on this bird very suddenly and, she rose almost at my feet and made off with a young one held tightly to her breast and, I think, held on either side by her claws. As she left three young ones behind her when she at first flew away, I at once hid myself and waited to see what further she would do. In a few minutes back came the old lady and dropped on the ground close to the nest and, after scuffling about a bit, she grasped one of the young ones on either side and picked it up. As she rose I could see her extended legs held the young one low down on either side, but she at once drew up her legs close to her body, and then appeared to be holding it between her thighs and her breast, this of course owing to the contracted position of her legs. Once started she flew quite easily to some distance, but seemed to find it rather difficult to get a comfortable hold of the young one at first. She removed all four a distance of 50 yards within about a quarter of an hour."

The birds sit exceptionally closely and I had a very good example once of the difficulty of making them move. Dr. Coltart and I on this occasion had found a Sparrow-Hawk's nest and while a man went up the tree to examine and report we seated ourselves on the ground below and waited. The tree was in a beech-spinney with a small stream running through the middle and the whole ground inches deep in fallen leaves. Coltart had sat for some time leaning on one arm with his hand on the ground, and when the man climbed down the tree he rose to speak to him and then from between his body and where his hand had been resting a Woodcock rose and flew off, disclosing four chicks, two still with half the shells on them. The bird could not have been three inches from Coltart's side and not two feet from where I was sitting alongside him.

(2168) *Capella nemoricola* (Hodgs.).

THE WOOD-SNIPE.

Capella nemoricola, Fauna B. I., Birds, 2nd ed. vol. vi, p. 255.

The Wood-Snipe is resident or semi-migratory in the Himalayas and sub-Himalayas from Dalhousie on the West to the Shan States on the East.

Where the Wood-Snipe breeds is still unknown. It is found in the sub-Himalayas during the Summer, *i. e.*, from May to September, both in the steamy tropical tracts at the foot-hills and in the more moderate heat up to 8,000 and 10,000 feet elevation. In Malda, Purnea and other districts it used to be almost common in April and May, haunting the dense jungle, reed-beds and swamps below the foot-hills, and they were often shot when sportsmen returning from big-game shooting worked through them. As no tiger-shooting is done in June of course no birds were seen, and one cannot say if they were in these same places or not. Livesey says that they are comparatively common in the Shan States and that he has shot

eight in one day. He shot a male on the Inle Lake on May 19th, 1929, but the testes were not enlarged, though he thinks these birds may breed in the extensive reed-beds growing round parts of this great lake.

The eggs found by Mandelli in Sikkim were undoubtedly those of the Solitary Snipe and will be referred to under that bird. Hume, however, says: "that they breed in the Himalayas between elevations of about 7 and 10,000 feet is certain. That they begin to lay early too is probable. Hodgson notes that on the 10th March the eggs in the ovary of a female were swelling, and another shot in April contained a nearly full-sized but unshelled egg. But no European, I believe, has ever yet taken the nest, though Mr. A. G. Young writes that he knows that they *do* breed in Kulu."

My own experience is very meagre and teaches us little. On the 11th June, 1908, one of my Khasia collectors brought in to me a female Wood-Snipe together with a single egg and some fine tangled grass, which he said had composed the nest and which was matted and clogged with the contents of other eggs which had been broken by the trapped bird in her struggles to escape. Unfortunately the one egg which escaped destruction appears to be an abnormally small one, for my collector told me that as he was setting the nooses round the nest he saw that it contained three big eggs and one much smaller, but that in colour they all seemed alike.

The nest was merely a mass of very fine shreds of grass-blades fitting into a shallow saucer-like cavity in moss among some bracken growing in Pine-forest beside a small stream. Judging by the remains the nest must have been about 4 inches in diameter by about one deep, with a well-marked depression for the eggs. The elevation was between 5,500 and 6,000 feet, the ravine being overgrown with evergreen bushes and trees, though the forest itself was Pine.

The egg is very like an egg of the common Snipe but is very grey-brown in tint. The ground-colour is a pale stone while the markings consist of heavy blotchings of vandyke-brown with a few underlying ones of grey and lavender. The smaller half of the egg is very sparsely marked but, on the larger third, the blotches form a broad dark ring, inside which the markings are numerous but not confluent.

The texture is fine and smooth with a faint gloss, while the shape is the usual pyriform. It measures 38.0×27.2 mm.

When found, the eggs were fresh and I was told the bird returned to her nest after being disturbed and was caught almost at once.

(2189) *Capella solitaria* (Hodgs.).

THE SOLITARY SNIPE.

Capella solitaria, Fauna B. I., Birds, 2nd ed. vol. vi, p. 257.

This is another bird concerning whose breeding habits we still know next to nothing. It is found and, presumably, breeds from the
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Altai Mountains to Manchuria and from thence South to the Himalayas and hills of Northern Burma, having been shot as far East as the Shan States.

Within Indian limits it has only been found breeding by Mandelli, though at the time he recorded it as *nemoricola* when sending the eggs and skin to Hume. The latter writes :—“The late Mr. Mandelli's men found four clutches of eggs of this Snipe in June in Native Sikkim, opposite Darjiling, at an elevation of about 11,000 feet.

“The eggs of this species strongly recall some varieties of those of the Common Snipe and of *Gallinago major*. In shape they are broad, almost hemispherical in the larger half, and abruptly compressed from the middle and pointed towards the small end. The shell is stout but compact and has a decided though faint gloss. The ground is pale stone-colour and about the larger end they are densely and boldly blotched, the blotches mostly longitudinal in their character, and radiating in curved lines from the broad apex of the egg, with a rich brownish maroon, almost black in some spots, the blotching being intermingled with very similar-shaped subsurface-looking pale, inky-purple patches and clouds. In one egg the markings are almost entirely confined to the upper third of the egg, where they are all but, in places, quite confluent. In the other the markings, though somewhat less densely set, extend over the whole upper half of the egg; very few markings, and these much reduced in size, extend in either to the lower half of the egg.

“Ten eggs vary from 1.66 to 1.75 in length and from 1.21 to 1.28 in breadth.”

My own experience is nil and, though I shot a male in North Cachar in May with enlarged testes, I do not think they bred in the Assam Hills.

In 1908 Masson sent me two clutches of eggs which he was most emphatically certain were those of this bird taken by himself on the Singalila Ridge above Darjiling at an elevation of some 10,000 feet. No bird was sent with the eggs and, to my never-ending regret, I returned them. I had no copy of Hume's ‘Nests and Eggs’ to refer to at the time so, as I never kept eggs imperfectly identified, I had to return them, but I have now no doubt that Masson's identification was correct, and Hume's description, as given above, would have sufficed word for word for them. These eggs were taken, I believe, in the first week of June. The pink tinge, derived from the wonderful maroon blotches, was very striking.

I have eggs from Krasnoyarsk and another taken by Ruckheil, but these are just like large eggs of the Common Fantail Snipe or ordinary eggs of the Great Snipe.

In millimetres Hume's eggs measure about 43.2×32.0 .

Capella gallinago (Linn.).

THE SNIPE.

(2171) *Capella gallinago raddii* (Buturlin).

THE COMMON OR INDIAN FANTAIL SNIPE.

Capella gallinago raddii, Fauna B. I., Birds, 2nd ed. vol. vi, p. 261.

The Common Snipe*, whether or not separable as an Eastern race, breeds freely in the Himalayas from 5,000 feet upwards and many collectors have obtained nests and eggs in Kashmir.

Here it is found breeding both in the marshy pasture-land round the lakes and occasionally on the floating masses of weeds which form islands on them, often strong enough to allow of people walking over them, so long as they keep on moving. Two clutches of eggs given to me by Ward are said to have been taken "from neat little nests worked out in tufts of quite soft green grass in marshy meadow and well hidden."

Snipe breed on almost any kind of wet ground but I think—I speak now of India—they prefer open land such as wet pastures, sedge and grass-land where the soil is boggy, with here and there water actually standing in little pools and, perhaps, a thin growth of rush in patches. Much land of this nature is to be found round some of the lakes in Kashmir, and these form their main nesting-grounds. Of course a certain number penetrate deeper into the swamps and lakes, making their nests in the dense reed-beds, on the floating islands, or in among bushes, but such nests only number one in five or six or more. I have never heard of their breeding in forest or jungle, but an odd nest or so has been found in large pools with weedy edges surrounded by strips of forest.

The nest is nearly always well hidden in among the roots of the grass, weeds, bushes or whatever it may be placed in. A very favourite spot is a thin tuft of rushes, the nest being placed well in the centre and screened by the sedge all round. Often it is placed in rank grass, in the footprint of some cow or other animal which has been feeding on it, the nest tucked well away from view among the roots, yet not resting on the actual wet soil.

The nest is usually composed of fine shreds of grass, bents and bits of reed-bark, but sometimes also of weed-stems, leaves and similar materials. As a rule it forms a pad some 4 inches across, with a well-defined depression for the eggs. Sometimes there is

* The general opinion now seems to be that *raddii* cannot be maintained and this will possibly prove to be the case. The few breeding birds I have been able to examine from the Himalayas, however, do show whiter axillaries and under wing-coverts than usual. My notes, therefore, refer to Asiatic birds only.

no material added to the growing grass, which is bent down and then worked round to form the nest.

In the plains, of course, this Snipe never breeds unless the female is damaged and cannot fly and her mate can be persuaded to stay with her. In the Santhal Parganas I saw two nests with eggs evidently laid by birds under these circumstances, and a very good Mahomedan Shikari told me that he had once previously seen such a nest.

The breeding season commences in the last few days of April but most eggs are laid between the 1st and 15th May and thence, in lessening numbers, into June.

Four eggs are nearly always laid, though an occasional five and a good many threes have been recorded.

In shape the eggs vary from broad to rather long pyriform, occasionally not very pointed. The texture is not very fine nor close; as a rule the surface is smooth and hard but there is no gloss and the eggs are fragile for their size.

The markings consist of large, irregular blotches, spots and dots of rich brown, often almost black and rarely with a purple tint. Occasionally the marks are duller and smaller. The secondary markings are of grey, sienna or pale purplish-brown, fewer in number but distributed in the same manner as the primary, that is to say, very numerous at the larger end and gradually getting sparser towards the small end.

The ground-colour varies from a pale grey-green, grey stone-colour to a comparatively dark olive-grey, olive-brown or yellowish-brown. In Indian eggs, however, brown is the prevailing impression, and variation, judging from the few I have seen, is not nearly so great as in European eggs.

Sixty Indian eggs average 38.3×28.5 mm.; maxima 43.1×28.9 and 40.9×30.0 mm.; minima 35.4×27.8 and 36.3×25.3 mm.

Both sexes incubate but the female does the greater portion of the work; the time taken in incubation is said by Witherby to be nineteen to twenty days. In Europe Snipe often have two and sometimes even three broods in the year but, in India, they are single-brooded though, like other birds, they will lay again if the first set of eggs are spoilt or lost.

The bleating or drumming of the Snipe during the breeding season is well known and there is no better description of this performance than that given by Manson-Bahr, already quoted by me ('Game-Birds,' vol. ii, p. 71, 1921):—"I find that ordinarily the bird flies up to a height of 60-100 feet above ground, in windy weather going higher, with the tail held in ordinary position of flight, then, turning, it spreads its tail like a fan, the two outer tail-feathers being spread out well in front of the other twelve and held firmly there. Immediately the birds begin to descend the bleat is heard (making due allowances for the time it takes for sound to travel). While descending, this bird makes tremulous motions

with its wings from the radio-carpal joint. The descent is made from 30 to 40 feet and occupies two or three seconds, the bleat lasting all the time. The bird does not drop head foremost through space, but at an angle of 45°-60° with the horizon. The tail as a whole is not vibrated, but it is quite easy to see the two outer tail-feathers with a strong glass vibrating to such an extent that their terminal portions become indistinguishable. Snipes begin to bleat in March, but, if the weather is mild, in February, and continue to the end of May.

"At the beginning of the breeding season they may be seen bleating in pairs; but later on, when the hen is sitting, the cock bird may be seen performing alone over the marsh where the nest is placed. Under favourable conditions many bleat together, circling round the same spot for hours.

"Snipe bleat best in the early morning and evening, especially when the weather is dull and damp."

(2173) *Capella stenura* Bonaparte.

THE PINTAIL SNIPE.

Capella stenura, Fauna B. I., Birds, 2nd ed. vol. vi, p. 263.

The real breeding range of the Pintail Snipe is Ussuri Eastwards in Siberia. Popham also found it breeding in some numbers on the Yenesei River in Western Siberia. In India it does not breed except in abnormal circumstances, such as a bird being wounded and unable to take long flights. Personally I have taken two nests of this Snipe in North Cachar, while H. A. Hole also obtained one nest with three eggs and one with a single egg near Jallalpur on the borders of the Sylhet-Cachar districts. I have no doubt these nests belonged to "peppered" birds. The two nests taken by myself were found at Guilang, a peak in the Barail Range in North Cachar. Here there had once been one of our little frontier stockades and the deep ditch all round where it had been lay intact, the bottom nearly always wet. On the 21st June, 1890, some Nagas brought me two Snipe and said they had noosed them in this ditch, and on the bank of it we soon found the nest, with four eggs. The nest was a circular pad of fine roots and grass with a depression about half an inch deep in the centre, compactly put together and wedged in among the roots of long soft grass. The position itself was dry but all around the bank was quite wet, and there was water at the foot of it. The birds appeared to be sound in every respect but probably one or both had received some injury. The nests found by Hole in 1889, one containing three and the other a single egg, were both built in among the rank grass growing on the banks made to divide the rice-fields. Another nest was taken in the swamps all around the Rifle Butts on the Silchar Range and,

finally, I have an oviduct egg from a bird shot in early August by Col. Evans, while another bird shot in August of 1887 or 1888 contained a fully-formed but soft-shelled egg.

All the eggs above referred to are indistinguishable from those of the Fantail Snipe and are no bigger than they are. At the same time eggs taken by Popham are, I believe, much bigger but I have not the measurements, while eggs sent me by Kuschel, said to have been taken in Eastern Turkestan, are also similar in size and appearance to those of the Common Snipe.

Thirteen eggs average 40.5×28.8 mm.: maxima 44.2×30.4 and 40.0×31.5 mm.; minima 37.0×28.5 and 39.5×27.0 mm.

Prjevalsky gives the following account of its courtship display:—
“Rising into the air similar to our *G. scolopacina*, and describing large circles above the spot where the female is sitting, it suddenly dashes downwards with great noise (which is most likely made by the tail-feathers and somewhat resembles the noise of a broken rocket). As the bird approaches the ground the noise increases until it has got within a hundred yards, when it suddenly stops the sound and quietly flies on, uttering a note which sounds like ‘Tiric, tiric, tiric.’ Courtship lasts until the middle of June, and is mostly heard or seen in the mornings and evenings, but occasionally in the day-time and even at night in the clear weather.”

Order X. STEGANOPODES.

Family PELECANIDÆ.

(PELICANS.)

(2179) *Pelecanus philippensis* * Gmelin.

THE SPOTTED-BILLED PELICAN.

Pelecanus philippensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 274.

There are a few small colonies of this Pelican breeding in the Carnatic, Ceylon and on the Godavery but the vast majority of our Indian birds retire to Burma for breeding purposes. Outside the Indian Empire they occur over practically the whole of the Oriental Region but seem to be capricious in the selection of their breeding haunts and, though they scatter far and wide in the non-

* For a note on the name this Pelican should bear see Bull. B. Œ. C. vol. lv, p. 63, 1935 (Grant and Mackworth-Fraed). According to these authorities the name should be *Pelecanus roseus* Gmelin.

breeding season, assemble in vast multitudes in certain chosen forests for breeding purposes.

Most of the eggs I have seen and most of the nests sent me have been from the wonderful colony which is described in Hume's 'Nests and Eggs' by Oates (vol. iii. p. 276 *et seq.*) and no fuller or better description can be wanted. He writes:—"Last November it was my good fortune to visit a pelicanry which, for extent, is possibly not surpassed by any hitherto visited.

"On the 8th November, 1877, I found myself in Shwaygheen on the left bank of the Sittang about halfway between Rangoon and Tounghoo. The country to the West consists of an immense plain of indefinite length and extending to the foot of the Pegu Hills. During four or five months of the year, from July to October or November, it is nothing but a most dismal swamp, inundated to the depth of 10 feet in many parts.

"Leaving Shwaygheen we reached the mouth of the Hsa-zay Creek and next morning we reached Kadat, a small village where we expected to find the Pelicans.

"The whole stream from Sittang to Kadat runs through beautiful forest with spare undergrowth and in many places the stream narrowed so much that we had carefully to pick a way for the boat between the trees. Immense flocks of Pelicans and Adjutants were flying in circles over our heads the whole day.

"On the morning of the 11th I started early with several Burmans into the forest. The floods had gone down but the ground was very muddy and, in many cases, for long distances, the water came up to my knees. Every quarter of a mile there was a depression or a nullah to be crossed, and I soon gave up any idea of keeping myself dry. Walking was very laborious, for though there was no undergrowth of jungle to speak of, yet the roots of trees embedded in mud and water caused me frequently to trip up.

"The whole forest consisted of very large trees, but a portion, about one in twenty, was made up of wood-oil trees, gigantic fellows 150 feet high, and with a smooth branchless trunk for 80 or 100 feet. These are the trees selected by the Pelicans.

"I was out that day till 3 P.M. and must have walked at least 20 miles in various directions but never, from first to last, was I out of sight of a Pelican's or Adjutant's nest. I compute the breeding-place of these birds to be 20 miles long by 5 broad.

"I shall describe the Adjutants' nests presently, but with regard to the Pelicans I noticed that no tree contained less than three nests and seldom more than fifteen. Some birds select the upper branches, placing their nest in a fork, but others, the majority, placed their nests on the nearly horizontal branches of the tree not far from the trunk. In all cases the nests on one branch touch one another, and when these nests were on a horizontal branch they looked like an enormous string of beads.

"Judging from the size of the bird I should say the nest was

about two feet in diameter and, when in a fork, about 18 inches deep. Others on flat branches are shallower. They are composed entirely of twigs and small branches and I could detect no lining in those nests thrown down to me.

"The eggs are invariably three in number, and on the 11th November all I took were either fresh or only slightly incubated. The female sits very closely, and frequently I found that the bird would not fly off her eggs until I fired a gun. It was a most ludicrous sight to see the sitting bird stretch head and neck out of the nest to look at us.

"The only trees the Burmans can climb on the spur of the moment are those which their arms can encircle. To be able to climb *any* tree it is necessary to make bamboo spikes the day before. These are driven into the trunk as the man mounts, and the operation does not take long.

"Notwithstanding the millions of birds which breed in this forest, a most wonderful silence prevails. The Pelican seems to be perfectly mute and the Adjutants only bellow at intervals. The only sound which is constantly heard is a sort of Æolian harp caused by the movement of the wings of innumerable birds in the air."

To-day much of this great breeding haunt stands as it did in 1877. In 1910 Wickham visited it and, though more cultivation may have forced back the forest to some extent, countless millions of birds still breed over a vast area, in Wickham's opinion far greater than even Oates gave it credit for being. Yet another 25 years have passed since this visit, yet quite recently a friend informs me that the Pelicans and Adjutants still wheel all day overhead and over their nests just as they did then.

In Ceylon Legge reported them as breeding in company with *Tantalus leucocephalus* and *Falcinellus igneus*, having fledged young in February and March. Eggs sent me from the Godavery were taken in December, when there were fresh eggs and incomplete clutches. In Burma they breed principally in November but eggs may be found from October to December.

Three is the number of eggs generally laid but four or two only are occasionally incubated.

The eggs are dull white at first but soon become terribly stained and dirty and have a white inner membrane, not green like that of the Adjutants who breed with them. The outer texture is very chalky but very smooth and the grain comparatively fine and close. In shape they vary from long to moderate ovals, both ends being nearly equal.

Fifty eggs average 78.8×53.4 mm.: maxima 83.0×54.2 and 81.5×57.8 mm.; minima 71.4×47.7 mm.

Family PHALACROCORACIDÆ.

(CORMORANTS and DARTERS.)

Subfamily PHALACROCORACINÆ.

(CORMORANTS.)

Phalacrocorax carbo (Linn.).

THE LARGE CORMORANT.

(2180) *Phalacrocorax carbo sinensis* (Shaw & Nod.).

THE INDIAN LARGE CORMORANT.

Phalacrocorax carbo sinensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 277.

This Cormorant has an enormous range, extending from England (casual occurrence) to Japan and over practically the whole of Asia, including the islands.

The Large Cormorant breeds in many places in India and Burma and in Ceylon. Scrope Doig found a large colony breeding in the Eastern Narra, Sind; Bulkley records a colony on the lake near Kharaghora containing some 70 or 80 nests; Jesse tells me that there are at least two colonies breeding on the Tumna, probably the ones referred to by Hume; Terry writes of a colony breeding in a tank on the Madras railway about 40 miles from Bellary; Oates found a colony in Pegu breeding in the Myitkyo swamp; Harrington records one in the Bhamo Hills and Hopwood, Mackenzie and Macdonald also found breeding colonies in Upper Burma; finally, I saw colonies on the Subansiri in Upper Assam and on the Barak River and other places in the Surma Valley.

They seem to have two well-defined kinds of breeding ground: one on rocks by rivers, the other on trees in lakes, tanks or swamps or in reeds round the shores of these places. Hume has good descriptions of the last.

The first of the many referred to above, Scrope Doig, thus describes the nesting place of this Cormorant in Sind:—"The breeding ground was in the middle of a swamp called the Samara Dhund, and the nests were placed on old withered Tamarisk-trees standing in water 8 to 10 feet deep. The nests were large platforms of sticks, about 2 feet in diameter one way and about 2 feet 6 inches the other way, that is, they were more oval than circular. The

eggs were laid on a thin bedding of rushes and grass, and the greatest number I got in one nest was seven. Some had only three, others four, five or six; the latter seemed to be the normal number, though some nests had only four young ones, just hatched. It evidently was an old breeding ground, as I could count three or four old nests under the present ones, so that the nests were sometimes three feet thick. There were no other kind of Cormorants, or in fact any kind of aquatic bird, to be seen in the swamp except a few Pelicans. The nests were only about 4 to 6 feet above water, so that I had nothing to do but stand up in the boat and gather. The total length of the breeding-ground was about one mile by about 80 yards wide."

The colony described by Oates in Pegu was similar, except that the nests were on trees, which reared "their heads 15 or 20 feet above water. There were either four or five eggs in each nest. I took the eggs on the 4th October, but up to the 27th of that month I observed a great number of birds still carrying sticks and weeds towards their breeding quarters."

A wonderful example of their rock-breeding haunts is that on the Subansiri River. The colony is situated on the banks of the stream a few miles above where it debouches into the plains. Here for about half a mile there is a still deep pool which the natives believe to be bottomless, perhaps varying from 50 to 100 yards wide, peaceful and comparatively slow even during the wildest floods. Above and below the pool the river is a torrent rushing between great rocks in one long succession of falls and rapids. On either side the hills rise up several hundreds of feet above the water, leading to the great mountains above them. At the water's edge the bases of these hills are a jumble of rocks, with here and there catchments in which some soil has lodged and a few trees and bushes have a precarious existence, mostly already half killed by the excrement of the Cormorants. The colony numbers many hundreds, perhaps two or three thousand pairs, perhaps far more, which have their nests on these rocks; some only two or three feet above flood-level, others on rocks forty or fifty feet higher up. Where there are many suitable ledges or flat rocks the birds almost crowd one another out and I counted 80 nests, about, on one small patch; most of the nests actually touching one or more of the others. In other parts the nests would be widely scattered but, for the whole way up for about a mile, one is never out of sight of several hundred nests and within good view of forty or fifty. The natives say that this colony has *always* been in existence since the Cormorant was created and, certainly, it must have been there a long time. Each year the birds return to the same site and build new nests on the top of the old until they get top-heavy and fall off, or a gale comes and sweeps them away. In one place where the birds built on a triangle of rocks towards which a bank came

down and formed a fourth side the hollow between was filled with the nests which had fallen therein to a depth of several feet, a mass of rotting sticks and weed which must have taken many generations to accumulate.

The nests were made of weeds and sticks and the older ones were sometimes as much as three feet across and anything from two to four feet deep. The new nests of the year were much smaller, only some 18 inches in diameter and a few inches deep. They had no special lining but some had more dry water-weeds on the top than in the body of the nest. The sticks employed varied in size from small twigs to others a couple of feet long and two inches or more in diameter. A few nests were built on the bent-down branches of the trees and bushes growing between the rocks.

In this colony the eggs numbered three to five only in scattered nests, but where they were all *en masse* the birds seem constantly to lay in the wrong nest and I found three nests in the middle of such a group containing eight eggs, some fresh, some half incubated and one in each just hatching. Alongside these three were birds sitting on one or two much incubated eggs.

The vast numbers in this colony could be best realized by watching the birds at sunrise and sunset, when line after line, in seeming never-ending succession, wended their way to or from their fishing-ground. I counted ten such lines passing overhead within a few minutes, each line numbering about forty to fifty birds, yet they continued to pass long after I had ceased to count.

Captain Horace Terry found a small colony breeding on some rocks in the centre of a large tank in Madras, the nests containing eggs on the 17th January but, nearly everywhere else, they appear to breed from October to December. Betham obtained eggs from a colony near Satara, in Bombay, on the 24th January and these are the latest eggs of which I have record.

I think three to five eggs form the usual clutch and six but rarely while larger clutches are probably the produce of more than one bird.

In shape the eggs are long ovals, generally much the same at either end, but sometimes rather drawn out and pointed. The texture of the shell is hard, close and fine but the surface is covered with a layer of white calcium almost completely hiding the pale blue-green surface below, much the same in colour as a pale egg of the Heron.

One hundred eggs average 60.6×39.2 mm.: maxima 63.7×41.0 and 62.4×41.6 mm.; minima 56.2×37.0 and 59.2×36.9 mm.

Both sexes help in making the nest and both take part in incubation. The natives tell me this takes just over three weeks but I have never had a chance of verifying their statement.

A breeding place of these Cormorants is in many ways extraordinary. The young, hideous little black naked things, often of

greatly differing size and, presumably, age, utter most unpleasant sounds, while their parents, when disturbed, make astounding roars and loud croaking expostulations and wheel round and round overhead, their droppings making every thing and person below them utterly filthy.

(2181) *Phalacrocorax fuscicollis* Steph.

THE INDIAN SHAG.

Phalacrocorax fuscicollis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 279.

The Indian Shag is found over the greater part of India, in Ceylon and all over Burma. Hume says it "is certainly very rare in Upper India. I have never yet seen a live specimen, nor have I ever seen a skin from any part of the North-West Provinces north of the Jumna, from Oudh, the Punjab, Rajputana or Sind." At the same time he quoted Scrope Doig's account of their breeding in the Eastern Narra, and since then Bulkley informed me that he had found this Cormorant breeding there in company with the Large Cormorant during the Winter, the nests being placed on mangrove-trees in swamps. Ticehurst also says (Ibis, 1923, p. 459) that the bird is common and that he suspected it bred in "the enormous area of mangrove-forest that fringes the Southern shore," where, of course, both Bulkley and Eates found the nests. In the Northern United Provinces Jesso, Gill, Field and others have reported the breeding but the bird does not seem common. It is more numerous in parts of Southern India and becomes very common in Bengal, Assam and Burma.

Oates found one nest in Burma containing three eggs and his remarks, as also those of Scrope Doig and Butler, agree with my own experience.

I have seen many of these colonies, for this Cormorant, instead of assembling in huge colonies which feed over an immense area, only collects in quite small parties, and thus one may have several small colonies in one district in different swamps and even on quite small ponds. Within a stone's throw of Tinsukia station, on the Assam-Bengal Railway, there is a small tank with reedy sides and with bamboos growing on two of them, many of the branches overhanging the water. Here many Herons, a casual Darter, Green Bittern and other birds breed in a noisy colony, and here, also, three pairs of Cormorants bred. On the islands in the Chutla Bheel and Silcoori Bheel in Cachar and, again, in several swamps in Sylhet, small colonies up to fifty pairs breed in the groves and bamboos which grow on the higher islands or else make their nests on the smaller trees by the water's edge, often submerged for several feet.

I have no record of them breeding on rocks but, except for this, their nests and nesting habits are very much the same as those



COLONY OF LITTLE CORMORANTS (right) AND PAINTED STORKS (left).
(Keoladeo, Bharatpur, 1919.)

of the preceding bird. The nests, as one would expect, are much smaller, generally about a foot across and anything from three to six inches deep but, like those of the bigger bird, they are made principally or entirely of sticks, sometimes mixed with weeds and usually with quite a good lining of grass, bamboo-leaves or bits of rushes. They seem to have a special predilection for bamboos to nest on, and use the same clumps year after year but, though they sometimes repair an old nest, these usually get blown or knocked down during the non-breeding season. In Sind they breed either in Tamarisk-trees and bushes, half submerged in the swamps, or in the mangroves on the shore, in either case in company with the preceding bird or with the Little Cormorant or the Darter.

They seem to have two breeding seasons in Sind. Scrope Doig and Butler found them breeding there in July and Eates obtained eggs in the end of August. Bulkley, however, obtained eggs in December in Sind and at Kharagora in December and January. Elsewhere they breed after the rains commence from the middle of June to August and sometimes in September, while Livesey found them still laying during October in Bharatpore.

They lay from three to five eggs, occasionally six, and these are just small replicas of those of the Cormorant but average even longer in proportion to their breadth.

One hundred eggs average 51.3×33.2 mm.: maxima 55.8×35.6 mm.; minima 46.3×31.8 mm.

A clutch of three eggs taken by Eates is very remarkably coloured. The shell is the normal blue-green covered all over with the usual chalky deposit but, here and there, a further blue pigment seems to have been deposited and appears in very beautiful deep blue-green patches at the larger end on all three eggs.

Both sexes incubate but I cannot say how long the period of incubation lasts.

(2182) *Phalacrocorax niger* (Vieill.).

THE LITTLE CORMORANT.

Phalacrocorax niger, Fauna B. I., Birds, 2nd ed. vol. vi, p. 280.

This very common little Cormorant breeds all over India, Burma and Ceylon wherever there are suitable swamps, lakes, tanks or even small village ponds and pools. Moreover, this bird, so far as I know, unlike any others of the group except *carbo*, sometimes breeds on high river banks.

Normally they breed in rather small colonies of half a dozen to fifty pairs and, personally, I have seen nothing over about sixty pairs, though there may be several small colonies at no great distance apart. Thus on the North bank of the Brahmapootra in the Lakshampur district I found five or six small colonies breeding

within a range of some five or six miles, but here the country was nearly all swamp or high grass land, food was unlimited and clumps of small trees, standing in or just above the water, formed good breeding sites. Round Dibrugarh itself there were small groups breeding on clumps of trees or bamboos by village ponds, while in the Surma Valley, where I saw the biggest colonies, they were breeding both on the great swamps and on small tanks and ponds. Generally here, also, bamboos and half-submerged trees were resorted to for nesting purposes, though I found one colony, almost in the centre of a swamp, breeding in a reed-bed, making their nests about 4 feet from the water on masses of broken-down elephant-grass, which there grow about 10 feet high and completely screened the dozen or so nests.

Sometimes the colonies must be very large, for Oates writes that "incredible numbers of these birds breed in the reeds of the Myitkyo swamps. The water is alive with the young birds which tumble out of the nests. They seem quite happy in the water and, although some of the birds were certainly not more than a week old, they dived readily on my attempting to seize them.

A colony found by Hopwood on the banks of the Chindwin were all placed high up in a tall tree, there being about twenty nests in all.

The nests are small, about nine inches across and two or three deep and, when the previous year's nests are not destroyed, they repair them and use them again. Hume also says they sometimes use old nests of Crows and Egrets. This I have never seen them do but, as they usually breed in company with other birds, such as the other species of Cormorants, Snake-Birds, Egrets of various kinds etc., it is quite possible they may take another bird's nest by mistake. As a rule there is no lining but, sometimes, grass or rushes are placed over the twigs of which the body of the nest is composed, while the nests I found built in reeds were made entirely of reed-stems and quite well lined with rush-blades.

The breeding season over most of its range seems to be June to August, a few birds laying in September. In Ceylon, however, they commence to breed in January and eggs may be found in April, as Wait obtained some on the 8th of that month at Pollonaruwa in the North-East Province.

The eggs, three to five in number—I have never seen six—resemble those of other Cormorants in all but size.

One hundred eggs average 44.8×29.0 mm. : maxima 48.1×28.4 and 45.1×31.0 mm. ; minima 41.1×28.7 and 41.8×26.3 mm.

Subfamily ANHINGINÆ.

(DARTERS OF SNAKE-BIRDS.)

(2183) *Anhinga melanogaster* Pennant.

THE INDIAN DARTER OR SNAKE-BIRD.

Anhinga melanogaster, Fauna B. I., Birds, 2nd ed. vol. vi, p. 282.

The range of this Darter includes Ceylon, all India and Burma, whence it extends East and South through the Malay States to the Celebes and Philippines, while on the West it has been found in Mesopotamia.

The breeding habits of the Snake-Bird are very similar to those of the Cormorants except that, though they generally breed in small colonies, very often a pair nest all alone or with one or two other pairs only.

Their favourite breeding places are undoubtedly trees which in the dry season stand on the edge of swamps and lakes but which in the rains are surrounded by water, often several feet deep. Hume writes :—"Like the Little Cormorant, in whose company they so often breed, they seem to have a decided preference for thorny acacias, like the babool, to build on.

"I have seen many of these breeding haunts, and in every case but one they were small clumps of babool trees, which at the nesting season stood well out into the water, in some cases half a mile, although in the dry season merely standing at the edge of some lake, swamp or pond."

Again Butler writes from Deesa :—"The nests were large, composed of dead sticks, and closely packed on two low trees (about 15 feet high) growing out of the water. I cannot say how many nests there were, but the man who went up the tree brought me about 70 eggs, and there were any number of young birds in the nests as well."

Butler and Scrope Doig found them breeding in Sind from July to December "in dense tamarisk trees that had become partly submerged on a dhund in the Eastern Narra."

When one comes to Bengal, Assam and Burma they may be found breeding on almost any kind of tree and in almost any position in or near water. Colonies usually number half a dozen to twenty pairs but, in Pegu, Oates found a colony of at least 200 pairs breeding on a few low trees in Myitkyo swamp on the 6th August. On the Chindwin Hopwood found a small colony breeding on a single large tree by the river banks and Mackenzie records a similar colony, while both found single pairs breeding either on trees by rivers or on bushes and trees in swamps.

My experience in Assam has been much the same and I have found single pairs, two or three pairs together, small colonies and one large one of some sixty nests on the Dimaji Bheel in North Lakhimpur. Colonies are nearly always found breeding in company with other birds such as the Little Cormorant, Shag and many of the Egrets and Bitterns, the last more especially when breeding on low bushes mixed with reeds near the water's edge.

They do not ascend the hill-rivers to any height for breeding purposes but I found a single nest in some low bushes beside a sluggish pool in the Diyung River at about 1,000 feet elevation. Generally the nests are in most conspicuous positions, but this was well hidden in a low scrubby bush and completely screened by branches.

In Ceylon Legge says that it breeds commonly on the big inland tanks from January to March in small colonies of three or four pairs, some birds also breeding in the fresh-water swamps on the South-East coast.

The nests are not, I think, distinguishable from those of the Little Cormorant, and are merely flat platforms of small twigs, rarely mixed with water-weeds and even more rarely lined with grass or rushes.

The breeding season everywhere, except Ceylon, is from the middle of June to the end of October, though the first and last months are exceptional, while eggs have also been taken in Sind as late as December. In Ceylon, as recorded above, they breed from January to March.

The full complement of eggs is three or four and, though I have seen two eggs incubated, I have never seen a clutch of five.

The eggs could not be differentiated from those of the Shag but average, I think, rather narrower and are more pointed. Normally the eggs in texture and colour are the same as Cormorants' eggs. More eggs, however, have nearly all the outer calcium deposit wanting and many eggs look a pale blue. Some extraordinary clutches taken by Cox near Ahmedabad have quite definite, though very faint, blotches of grey, approaching the well-marked eggs of *Anhinga rufus rufus* and its doubtful race *chantrei*.

Eighty eggs average 52.0×33.5 mm. : maxima 55.7×33.6 and 54.2×37.0 mm. ; minima 50.7×33.6 and 51.0×31.5 mm. -

Hume gives a much larger average for sixteen eggs, i. e., 54.1×34.7 mm., but in his day measurements were taken much more roughly and in inches. Oates in the Museum Catalogue of eggs merely copies old statements and does not re-measure.

Order XII. HERODIONES.

Suborder PLATALEÆ.

Family PLATALEIDÆ.

(SPOONBILLS.)

Platalea leucorodia Linn.

THE SPOONBILL.

(2202) *Platalea leucorodia major* Temm. & Schleg.

THE INDIAN SPOONBILL.

Platalea leucorodia major, Fauna B. I., Birds, 2nd ed. vol. vi, p. 311.

This large race of Spoonbill is found from Afghanistan and Baluchistan to Ceylon in the South and to Japan in the East, while it extends West to the Persian Gulf and Mesopotamia.

The breeding of this common Indian bird was so well known in Hume's day that one can add little to his admirable account of it; he writes (Hume's 'Nests and Eggs,' vol. iii, p. 217):—"The Spoonbill is a very sociable bird. It always breeds in companies, at times small, at times enormous, almost always close to where more or less nearly related species (notably Shell-Ibises) have their nests, and very often in the immediate neighbourhood of houses. They always build on trees near to, or on the bank of, some broad lake or swamp; and though I have found many parties breeding far from human haunts, I have found many more breeding on trees actually in, or in the outskirts of, villages. In Baarehur, a large village a few miles from Etawah, three or four pairs of this species used to build, quite inside the place, on a few tamarind-trees standing inside a little courtyard. At Beenan some thirty pairs bred regularly on some half a dozen peepul-trees that fringe the margin of the large jheel on the banks of which the village stands. But the grandest breeding place I ever saw was about a dozen miles north of this in the south of the Mynpooree District, where the zemindars allowed no prowling sportsmen. When I visited this

place in August there was a large oval sheet of water, $1\frac{1}{2}$ mile in length, and half this in width, clear, bright, and calm, but dotted over here and there with rushes and lotus-leaves. The village stands on a pretty high mound immediately overlooking the lake and towards one end. The whole lake is almost entirely shut in by trees all round.

"All the trees on the right of the village were occupied by Spoonbills, certainly at least two hundred pairs were breeding there, but a still larger number of Shell-Ibises had their nests in the trees on the left of the village. The neem-trees and the mangos were occupied by myriads of Egrets, Paddy-birds, and White Herons, and a clump of acacias was tenanted by the Little Cormorants and Darters. In a kudum-tree were several nests of the Whistling Teal. In a huge hollow in a mango-tree we got a Nukhtah on eight eggs and the entire lake was alive with these various species.

"The zemindars sent boys up to report on these nests. At least a hundred of those of the Spoonbills were looked at and only three or four contained five eggs or young ones and eggs; in the great majority there were four. The nests were all of the normal type,—large platforms of sticks, 2 or 3 feet in diameter and from 3 inches to nearly a foot in depth.

"The birds had bred here anterior to the traditions of the village. One thing was notable—though the birds were strictly preserved, it was declared by all the people that during their lifetime no perceptible increase in the numbers of any of the species had taken place, nor had they ever altered their respective quarters.

"Many of the nests were blown down every year, many more were pulled down by the boys for fuel, but where nests remained intact all the pair that re-occupied them did was to add a few sticks and perhaps throw down a few old ones."

Generally nests are placed low down but Bingham found a small colony breeding high up in some trees by a little swamp near Cawnpore, the nests containing slightly incubated eggs in August.

Bates in his charming book 'Bird-life in India' gives a beautiful description (p. 20 *et seq.*) of a tank named Vedan Thaugal about 12 miles from Chingleput in Madras. This tank, about 25 acres in extent, is inhabited by a vast concourse of water-birds similar to that described above by Hume. Of the Spoonbills he writes:—"A few colonies of considerable strength were to be noted, but the nests were generally distributed throughout the Heronry, though single nests were rare. They were placed practically from water-level to about half way up the trees and, although usually on the outer surface of the tree, a few were placed on branches well inside the foliage and so shaded from the direct sun. The nests varied considerably in construction, some being flat structures with fine twigs or grass for lining, others lined with leaves and so

very like Open-Bills' nests. Yet again, not a few were bulky affairs nearly as deep as wide. They were in considerable strength and, I think, to put their numbers at 300 or 400 pairs would in no way be an exaggeration. They were on the whole the latest birds nesting, as the majority of eggs were only just hatching on my visit on February 7th in the earlier of the two seasons; while on December 29th, 1929, I noticed only two nests with eggs, while on February 16th I saw no nests with young."

No colonies are recorded in India as breeding in reeds, though in Europe they often do so.

In Northern India the breeding season is after the rains are well advanced, the lakes and marshes having had time to fill and overflow. The birds begin to congregate in their nesting-haunts in June and July and egg-laying starts in earnest at the end of this month and in August. In Sind, however, Butler and Doig found a colony with incubated eggs on 11th November, breeding near a colony of *Tantalus leucocephalus*.

In the South of India they breed from November to January and February, most eggs being laid in January, while in Ceylon Legge says that they breed in March. In the Deccan Davidson and Wenden say that it is "common and breeds in April and May." The number of eggs laid is three or four, rarely five.

The texture of the egg is rather coarse but fairly close, while the surface is smooth, very slightly chalky and without gloss. In shape most eggs are long ovals but they vary from moderate to decidedly long, distinctly smaller and compressed at the one end and sometimes even pointed. The ground-colour is chalky white, Hume says occasionally faintly tinged with pink or yellow, though this I have never seen in blown eggs. They are sparingly blotched with small blotches and spots varying from light brown to very dark brown, sometimes tinged with red. Many of the markings look as if they had been painted on and then smeared. Secondary markings are generally pale grey-brown or pinkish-grey but are inconspicuous and often absent. Both primary and secondary markings are rather more numerous at the larger end and sometimes pretty dense at their extremity.

Forty eggs average 65.6×44.2 mm.; maxima 72.1×45.1 and 70.0×47.7 mm.; minima 61.1×45.3 and 61.4×41.0 mm.

Both sexes incubate but there is nothing on record as to the period of incubation.

Family PLEGADIDÆ*.

(IBISES.)

(2203) *Threskiornis melanocephalus* (Lath.).

THE WHITE IBIS.

Threskiornis melanocephalus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 314.

The White Ibis breeds in Ceylon, more or less all over India from Baluchistan and the Mekran coast to Bengal. It also occurs in suitable places all over Burma and extends thence into China and South Japan.

Like all other Ibises, Storks and similar birds, the requisite water with its food-supply is the matter which regulates the breeding haunts and breeding times of the present Ibis.

They breed in colonies, generally small ones, making their nests of sticks in trees, very often in company with various other birds, and the character most noticeable about them is the fact that the birds are fond of placing them all in a mass so close together that many touch each other. Another characteristic is that they often choose large trees to nest on, whereas many other birds prefer lower ones closer to the level of the water."

Major Bingham found them "breeding in large numbers on the 19th August on a mighty tamarind-tree, on the north bank of a large tank in the centre of the village of Mohar.

Harrington Bulkley obtained them breeding in Cutch "in small colonies on the tops of large trees, but a colony at Kantha were on quite low babool-trees standing in water, so that the nests were close to the water."

Hume says that they prefer "large banyan, peepul and tamarind trees" to nest in but Butler says that a colony in Sind were breeding "in a tree that had been partly blown down in the centre of a dense tamarisk thicket growing in the middle of a large dhund," the nests "8 or 10 feet from the surface of the water."

Wait says nothing of their breeding habits in Ceylon but Legge says that "several pairs" were breeding at Uduwila tank "but their nests were on trees growing in the water and inaccessible."

The nests as a rule are not big. Hume mentions one 20 inches across and says they vary from this to 2 feet. Blewitt also refers to one of two feet taken by him at Jhansi. Butler merely says that

* As explained in vol. viii of the 'Fauna,' the Latin name *Ibis* is applicable to a species of Stork, so we must accept *Plegadis*, the oldest generic name, as the basis for the family name. I do not, however, think it wise to discard the trivial name *Ibis*.

the nests found by him "were small stick-structures." Bates, however, is much more definite and, after visiting one of their breeding places two years running, writes ('Bird-life in India,' p. 40):—"The nests were small structures, eight inches or so across, flat and unlined," while one of his beautiful photographs shows eight small nests, very loosely and untidily built, all jammed together within a space of two or three square yards.

They are always built of sticks, which are very often obtained from the tree on which they are built. In 1928-9 Bates noticed that they had "a heavy grass lining so profuse and at times so carelessly laid on that lining and eggs looked likely to slide off into the water." The sticks of which they are made are for the most part small but, in a few cases, measure a foot or more long by about an inch to two inches in diameter.

As with so many other water-loving birds the rains govern the breeding season and in Upper India the birds have to wait their advent before thinking about breeding. When the rains break, as they usually do about the 15th June, the White Ibises gradually collect in their breeding haunts and by early July the first birds have begun to lay while later birds, which keep on arriving up to mid-August, continue to lay until well into October.

In Ceylon Legge shows that they lay from January to March, while in Madras Bates found them laying from December to March but varying according to the lateness of the rainfall. In 1928 he found a few nests with eggs on the 20th December but on the 29th birds were still coming in to the tank; in 1929 they nearly all had eggs by the 29th of that month.

They lay two or three eggs normally but sometimes four, while no fives have been recorded.

The eggs are long ovals in shape and the texture much the same as those of the preceding birds. They appear to be white but, if placed alongside the eggs of the Spoonbills, are seen to have a faint bluish tinge. Most are immaculate but a few have tiny black specks at the larger end, or small indistinct flecks of reddish hue distributed on the surface anywhere.

One hundred and fifty eggs average 63.5×43.1 mm.: maxima 70.8×49.2 mm.; minima 56.8×37.6 mm.

Both sexes incubate but there is no record as to time of incubation. Bates's notes give some guide to this, for he remarks: "A colony of four nests was noted on December 20th. By January 13th the original colony had tiny young ones." When discovered, very few birds had begun to breed, so probably the eggs were then fresh or nearly so. It therefore looks as if twenty-three to twenty-five days was the period of incubation.

(2204) *Pseudibis papillosus* (Temm.).

THE INDIAN BLACK IBIS.

Pseudibis papillosus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 316.

This Ibis is distributed in Northern India from Sind on the extreme West to Bihar in the East. South it is found to Mysore on the West coast but on the East it is said not to occur in Bengal southwards. Godwin-Austen, however, obtained it in Mymensingh, while I obtained a pair, breeding, in Dacca and also a single specimen in Sylhet.

Unlike most of the birds of this family, the Black Ibis does not breed in colonies. Generally a single pair occupy a tree all to themselves, placing their nest at a considerable height from the ground. Sometimes, however, they collect in small parties of two or three pairs and so also they sometimes build comparatively low down.

Hume says: "I have never found these birds breeding in society with other species. Twice or thrice I have found two or three nests together but as a rule they are solitary. They build high up upon large trees, often at the very top of these, and make a large nest of finer and coarser twigs, often unlined, but more often thinly lined with straw, grass or (Mr. Blewitt says) old rags.

"They occasionally to my knowledge—and possibly often—take possession of nests previously occupied by the Indian King-Vulture, the Indian Fishing-Eagle and the Dusky Horned Owl. From nests from which I had taken the eggs of the latter in March, December and January I again in August took those of the Black Ibis."

Bulkley also took eggs of this bird from an old nest of a Neophron, while both Inglis and Coltart obtained them from nests of the White-backed Vulture. Both these latter gentlemen say that, like Hume, they found this bird breeding all alone on high trees. Blewitt, however, found in Hansie three nests of the Black Ibis, two on small sheeshum-trees, 15 and 17 feet from the ground, and the third on a peepul-tree somewhat higher, though the following year he found two others, single nests on peepul- and burgot-trees at 25 to 30 feet up. Marshall records a nest taken half-way up a peepul-tree and another built on the extreme top of a tree of the same kind; this was in Aligurh. Peepul-trees are evidently a special favourite with this Ibis for nesting in and, in addition to those already mentioned, Bingham and others record nests built in them.

In Sind Butler and Doig and, again, Eates found the birds nesting in small colonies of three to five pairs, all on the same tree.

In Sholapur Davidson found many nests in December and January in small tamarinds and neem-trees and at Kanara a nest in May in a banyan.

The nest is always the same—a rather large affair measuring from 14 inches (Blewitt) to 2 feet in diameter and generally 4 to 6 inches deep, and is nearly always well, though loosely and untidily, lined with a quantity of grass.

The breeding season seems to vary somewhat. Many birds breed before the rains break from March to May, while many others do not lay until July and August, odd birds being found still laying in September. As noted above, in Sholapur Davidson took eggs in December and January, yet in Kanara and in the Deccan he took them in May and in the latter place “again during the last three months of the year.”

The number of eggs laid is three or, less often, four and sometimes only two. In Southern India two seems to be the normal full complement and even three exceptional.

The texture is coarse and hard but not so stout as in the eggs of the Storks. The surface is smooth but glossless. In shape the eggs vary from broad to long ovals, most being moderately long; some are pointed, some are quite blunt.

When first laid they are a rather beautiful pale blue like that of an Egret's egg but they very soon become soiled and dull, more a grey-blue. Some eggs are spotless but the majority have a few flecks and small blotches of pale reddish. An exceptionally beautiful clutch taken by Livesey has one egg a bright pale blue, a second has a rather darker ground with a ring of pale reddish specks round the large end, and the third is a still darker blue with a well-defined zone of reddish-brown and lavender blotches at the same end, the rest of the egg being immaculate. The three form a very good example of the extremes of variation.

Fifty-nine eggs average 63.0×43.8 mm.: maxima 70.3×44.2 and 65.4×49.9 mm.; minima 56.0×43.0 and 63.5×38.0 mm.

Both sexes incubate but the length of incubation is not known.

(2205) *Pseudibis davisoni* (Hume).

THE TENASSERIM BLACK IBIS.

Pseudibis davisoni, Fauna B. I., Birds, 2nd ed. vol. vi, p. 317.

This Ibis, which was described from Tenasserim, extends North-East to Pegu and East into Siam and Cochin China.

Very little is recorded about the breeding of this bird. Oates found a nest in Pegu which he describes as follows:—“The nest was placed on a branch of a tree, about 15 feet from the ground, on the bank of a creek. It was a small shapeless mass of sticks and contained two eggs so near hatching that I could only preserve one. It measures 2.55×1.8 ; it is smooth, without gloss and of

a pale blue, much stained by the birds' feet. The nest was found on the 13th February."

Packard obtained a nest with two eggs near Myingyan in Upper Burma. In this case the nest is described as made "of sticks with lining of grass about 30 feet up in a tree standing in a grass plain" close to a river. It contained two eggs. Similar eggs and a nest were also found by Grant at this place. They were taken on the 3rd and 20th March respectively.

The eggs are like those of the Indian Black Ibis but the seven eggs I have seen, all I believe ever taken, were only very faintly flecked with reddish or not marked at all.

The seven eggs, including that taken by Oates, average 63.0×43.2 mm. : maxima 66.3×46.0 mm. ; minima 61.0×45.4 and, 62.1×44.8 mm.

Plegadis falcinellus.

THE GLOSSY IBIS.

(2206) *Plegadis falcinellus falcinellus* (Linn.).

THE GLOSSY IBIS.

Plegadis falcinellus falcinellus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 318.

This beautiful Ibis has a very wide range, breeding in Southern Europe, a great part of Northern Africa, West and Central Asia to India. Within our own limits it occurs in Ceylon, over the greater part of India and parts of Burma.

Its habitat is curiously restricted by excessive drought and by extreme rainfall. It breeds in Sind along the canals and on the great lakes but never in the desert tracts of Sind, Rajputana or the Punjab. On the other hand they seldom occur in the wettest parts of Bengal, Assam, Burma or Southern India.

Hume only records their breeding in Ceylon and Sind but I have records of colonies in Oude, Orissa, Manipur, Burma and Assam, one colony in each of these provinces. Gill found it breeding in Oude, Annandale in Orissa, myself in Manipur and Assam, Macdonald in Upper Burma.

Referring first to Hume's accounts, Legge records from Ceylon that he "found the Glossy Ibis nesting at the end of March in thorny trees growing round a small tank in a wild part of the South-East of the island; there were about half a dozen pairs of the birds present at the heronry and they were nesting in company with *Pelecanus philippensis* and *Tantalus leucocephalus* and partly with *Platalea leucorodia* and *Graculus javanicus*. The nests were placed on the lower lateral branches of the trees and were of the same size as those of the Little Cormorant, constructed of medium-sized sticks and flat in shape.

"On the 26th March the young were all hatched, and well grown so that I failed to procure any eggs."

Scrope Doig, the other collector quoted by Hume, found the birds nesting in Sind in June 1879 "in great numbers on trees along the banks of the large lakes inside the sandhills, along the bank of the Narra. The nests were placed on the tops of kundy-trees and were constructed of sticks, about the same size as those of *Plotus melanogaster*; on the same trees I found *Geronticus papillosus* and *Tantalus melanocephalus* breeding, while close by there were numbers of nests of Herons, Egrets and Cormorants."

In Assam I know of one heronry in Barpeta, in the North of Kamrup, where about a dozen pairs of these birds bred in company with vast numbers of Egrets of various kinds, Little Cormorants and a colony of Open-Bills. The Glossy Ibises, when I saw them, were nesting on a clump of small trees standing in water and had eggs all through July. The nests, all built in two trees of the group, were made of small sticks and, so far as I could see, there were none more than 10 or 12 inches long and none more than half an inch in diameter, while most were much smaller. The nests were small, measuring about 9 to 12 inches across, while the new ones were only 4 or 5 inches deep. Some, which were obviously built on the top of old nests, were much deeper, one or two being nearly 8 or 10 inches.

In Burma Macdonald found fresh eggs in the end of May near Pakokku.

In Europe these birds lay as many as five eggs in a clutch but in India and Burma three seems to be the full complement and often two only.

In shape the eggs are rather long ovals, often decidedly pointed at the smaller end. The texture is fine and close for so large an egg, with a smooth surface showing a slight gloss when fresh. The colour is a deep unspotted blue-green, much darker than in any of the eggs of Herons or Egrets.

One hundred eggs average 52.18×36.9 mm.; maxima 57.8×38.0 and 57.5×43.0 mm.; minima 46.2×33.0 and 50.0×32.5 mm.

Suborder C I C O N I Æ.

(STORKS.)

Family CICONIIDÆ.

(STORKS.)

Dissoura episcopa.

THE WHITE-NECKED STORK.

(2210) *Dissoura episcopa episcopa* (Bodd.).

THE WHITE-NECKED STORK.

Dissoura episcopa episcopa, Fauna B. I., Birds, 2nd ed. vol. vi, p. 324.

This Stork is found in Ceylon and over the whole of India and Burma. East it extends through the Indo-Chinese countries and South through the Malay Peninsula and Archipelago to Java and the Celebes.

Unlike the Herons, Spoonbills and other similar birds, this Stork does not breed in company with others, though occasionally two, or even three, nests may be found on the same tree, while Butler found a nest of this Stork in a tree in which there were also two nests of the Common White-backed Vulture. The few I have personally seen have all been single nests high up in tall trees, generally over 30 feet from the ground and once at least 50. In Bihar, also, Inglis and Coltart found them breeding singly on high trees, usually selecting Simul-trees (*Bombax* sp.), though the former records finding two nests touching each other on one occasion (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 70, 1903). A single nest Inglis describes as being fully 80 feet from the ground and quite inaccessible. Hume, on the other hand, says "the nests are rarely above from 20 to 30 feet from the ground." Marshall found several nests between June and September in Saharanpur and notes that "some of the nests were on sheeshum and some on banyan trees, but all at the top of the tree." Blewitt found several nests near Hansie "all placed on peepul or burgot trees at heights from 20 to 25 feet from the ground."

There is nothing to add to Hume's description of the nests except that those I have seen have been larger. He writes: "They are densely built of twigs and small branches and have a considerable central depression, sometimes thinly lined with down and feathers and, sometimes, almost filled with straw, leaves and feathers, in

among which the eggs are sunk as if packed for travelling. The nests vary from 14 to 20 inches in diameter and from 4 to 7 inches in depth." Blewitt also says they vary "from 14 to 17 inches in diameter and from 4 to 7 inches in depth." Those I have taken or seen have been from 18 to 24 broad and anything, according to age, from 4 to 12 inches deep.

The birds often return to the same site and use the same nest or any portion of it which the winds and rains may have left available. They occasionally also, though I believe this is exceptional, lay their eggs in old nests of Fishing-Eagles or Vultures.

The breeding season in Southern India is from December to March. Davidson and Wenden record nests in December and January in Sholapoor and birds breeding near Satara in March. In Northern India they generally breed after the rains break, commencing in June and continuing up to August. In Bharatpur, however, Livesey took fresh eggs in October, while in Bihar Inglis and Coltart obtained most nests from May to July. In Burma also May to July seem to be the laying months.

The full complement of eggs is three or four, I think three nearly as often as four, while I have never seen five.

The eggs are white but soon become very dirty and soiled by the birds' feet, so that much-incubated eggs look uniform earthy brown, quite unwashable. The inner membrane is a sea-green, becoming duller with time.

The texture is moderately coarse but fairly smooth-shelled when fresh. The shape varies greatly from squat, broad ovals to long, pointed ones, while the size varies as greatly as the shape.

One hundred eggs average 62.9×47.4 mm. : maxima 72.3×47.0 and 72.0×49.3 mm. ; minima 57.0×46.0 and 61.0×43.6 mm.

Xenorhynchus asiaticus.

THE BLACK-NECKED STORK.

(2211) *Xenorhynchus asiaticus asiaticus* (Lath.).

THE INDIAN BLACK-NECKED STORK.

Xenorhynchus asiaticus asiaticus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 326.

This fine Stork is found over practically the whole of India, Ceylon and Burma, extending to Siam, the Malay States and Cochin China.

Wherever there are large swamps, lakes or other pieces of water with open country all round, there may this Stork be found. Nowhere occurring in great numbers and, generally, very sparsely distributed over wide areas, this Stork makes its huge nest high up in some big tree standing, for choice, all by itself, most often close to the

edge of the water, or even standing in it hut, at other times, growing in open cultivation or waste land nowhere near any water. The nest is huge and, as it is nearly always placed very high up in the tree selected, is, therefore, conspicuous from a great distance.

In size the nest may be anything from 3 feet in diameter and the one in depth to nearly twice these measurements. Most are something between 3 and 4 feet across and about a foot to 2 feet deep. Hume writes: "The nest, always a great platform of sticks, is sometimes enormous; one I found near Badlee was fully 6 feet long by 3 feet broad and so deep that three fully-fledged young ones were able to crouch in it so as to be invisible." Another one which Coltart showed me in Somastipur was even bigger than this and must have measured fully 5 feet each way in diameter and practically the same in depth, but this was an old nest which had been used for a long time and added to each year. The hollow in this particular nest was fully 8 inches in the centre, and this deep cavity for the eggs is typical of the nests built by this bird. It was well lined with coarse grass. Normally the nest is made entirely of sticks and branches, the latter being often used green with the leaves still adhering. Most of the sticks are small, somewhere about 6 inches to a foot long and $\frac{1}{4}$ to 1 inch in diameter, but a few large straggly branches may be used or bits of stick as much as 2 feet long and 2, or even 3, inches in diameter, forming a heavy load for the bird to carry. A lining is nearly always present composed of grass, reeds, leaves and other oddments.

An extraordinary nest is described by Blewitt, who says: "One nest I examined had a regular parapet of mud, the kind of clay we call *chiknee muttee*, all round the margin of the cavity, some three inches wide and two inches high." He adds: "The birds took more than a month building the nest, taking immense pains to finish it off. When it was nearly ready they put a sort of rim of clay all round the top of it; the old birds descended alternately to the tank and brought up the mud in their bills and then, standing on the nest, they seemed to manipulate and arrange it with the greatest care with their long bills.

Marshall says "they are sometimes walled round with karoundathorn."

Occasionally several nests may be found within a fairly small radius; thus Baboo Kalee Naryn Roy took four nests within a radius of a dozen miles round Jhujgar between the 9th and 16th September.

The breeding season appears to commence in September or October, depending a great deal on the early or late cessation of the rains, but most eggs are laid in October and November and not a few in December. This seems to be the case everywhere from Sind to Burma, in which latter country, however, Oates obtained eggs as late as 6th January.

The full complement of eggs is three or four, very rarely five, and they are quite typical Storks' eggs in every respect, in shape

broad, blunt ovals and pure white when first laid. The texture is coarse but the surface fairly smooth. The inner membrane of the egg is a dull green.

Thirty eggs measured by myself average only 69.5×53.2 mm., but forty-five measured by Hume average 73.9×53.8 mm., giving an average for this seventy-five of 72.1×53.4 mm. : maxima 74.9×53.4 and 70.6×55.2 mm. ; minima 67.9×54.0 and 68.5×51.0 mm.

This Stork, like most others, indulges in queer dances, most often during the nuptial season in courtship, but also at other times to a less extent. Hume describes these as follows :—"A pair will gravely stalk up to each other, and when about a yard or two apart will stand face to face, extend their long black and white wings, and while they flutter these very rapidly, so that the points of the wings of one flap against the points of the other's wings, advance their heads till they nearly meet, and both simultaneously clatter their bills like a couple of watchman's rattles. This display lasts for nearly a minute, after which one walks a little apart, to be followed after a moment by the other, when they repeat the amusement, and so on for perhaps a dozen times. Watching them closely through the glasses from little more than 100 yards' distance, I discovered that they never actually touched each other."

Although this was in December, it may have been a post-nuptial dance rather than a pre-nuptial one as, certainly in the latter case, the dances often end in closer contact.

(2212) *Leptoptilos dubius* (Gmelin).

THE ADJUTANT.

Leptoptilos dubius, Fauna B. I., Birds, 2nd ed. vol. vi, p. 327.

The Adjutant occurs, and probably breeds, in India, Burma, the Indo-Chinese countries, the Malay Peninsula, Sumatra, Java and Borneo.

At one time the Adjutant was one of the most common birds in Calcutta during the rains but municipal sanitation has replaced the scavenger work of the Storks and, their food no longer available, the birds have disappeared from all great Indian cities, not because of the depredations of the egg-collector but because, like the Kite in England, there is no more work for them to do.

A few colonies still exist here and there in India. One or two are still to be found in the wilds of Assam and in Orissa ; a larger one still, I believe, is to be found in the Sunderbunds and there was a small one, still perhaps occupied, near Goruckpore. In Burma, however, they continue to breed in the same myriads that bred there a hundred years ago and for many centuries before that. The only difference is that civilization has pushed the forests a little further back and with the forests the birds too have taken to remoter parts.

Oates is quoted by Hume as thus describing an enormous colony breeding in a forest West of Shwaygheen, in the Pegu district :— "Along with the Pelicans, breeding in the same trees, were innumerable Adjutants. One can hardly realize the number of these birds that visit Pegu in October, unless, as I have, he has seen the vast armies which settle on the plains on their first arrival. I have stood on a bund where I could see about two miles round me, and the whole area was literally covered with them. Some fifty birds stand huddled together ; then there is a bare space of some 100 feet, and then another group of birds. Their numbers are incredible. They all arrive suddenly in the Pegu plain on the same day, and after resting for about two days, they betake themselves to the forest, where I had the pleasure of visiting them. Certainly all the Indian Adjutants must come to Pegu to breed.

"On the same day we took the Pelicans' eggs we paid attention to the Adjutants, but whereas in the case of the Pelicans by climbing one tree you procure almost as many eggs as you care to have, with the Adjutants it is different. Frequently there is only one nest in a tree, rarely two or three, and in this case the tree selected is a stupendous one, with immense branches reaching 50 feet from the trunk and mostly horizontal. These nests are not to be got at even by Karens. Fortunately the nests are so frequent that there is no difficulty, in the course of a morning, in finding accessible ones in plenty.

"November 11th was a trifle too early. Many nests were still being built ; others had no eggs in them, and only a few had the full complement of three eggs.

"The nest is made entirely of coarse sticks, and it is of such a size that the sitting bird cannot be seen from below, except when she stretches her head out. It is wedged into a fork as near the exterior of the tree as possible, whether at the top or side.

"These Adjutants utter only one sound, and it resembles the lowing of a cow when separated from her calf. It was the only sound heard in these gloomy forests."

Frith (quoted by Blyth) wrote of a colony he had visited in the Sunderbunds. This may have been the same colony as one visited by my Father and myself in 1883 near Khulna. The birds bred here for many years, in a vast area of swamp and lake, on some very lofty trees in very dense forest quite close to the edge of one of the lakes. At the time we inspected it, January, there were about 40 or 50 pairs, some sitting apparently on eggs, others with small young ones.

A different type of colony is one at Ataran visited by Sparkes in 1848, Tickell later, and then by Bingham in the 'seventies. The latter's description is the fullest and the following is an extract from it :—"To the South-East of Moulmein, about 25 miles up the Ataran River, a low but excessively steep and scarped range of limestone rocks, called the Needong Hills, seen nearly at right angles

to the river on the north bank and, overhanging the water, present a strikingly bold and picturesque aspect. On the south bank this range is broken into four or five isolated masses rising abruptly from the surrounding plains.

"In the latter end of November and in December these almost inaccessible cliffs afford safe nesting-sites to the two species of Adjutants.

"On the 27th November as we passed under the hill over the left bank of the river I was delighted to see the Adjutants in full force. I could see the large guano-soiled masses of sticks which composed their nests.

"A denser and more matted belt of evergreen surrounded the base from which the rocks rose abruptly, towering above and hanging over each other in the most fantastic shapes.

"I was soaked with perspiration before I got to the first nest, which was placed on the flat surface of a block of rock nearly at the top of the hill. A hasty glance showed me four eggs resting on a mass of sticks and twigs, with scarcely any depression in the centre and unlined. Below this was a substructure of larger sticks, the whole mass, and the rock on which it was, whitened by the droppings of the birds. Having secured this prize I saw that there were no less than eight other nests in sight."

Both the Ataran colony and that in Pegu exist to the present day unaltered, except that there is more cultivation in Pegu, which has driven the birds a little further into the forests.

The nests are described as very large, varying from 3 to 6 feet in diameter and from 1 to 3 in depth, the deeper nests being apparently some years old and showing several layers of sticks of varying age. There never appears to be any lining.

The breeding season everywhere is from October to January, the great mass of eggs being laid in November and early December, the cessation of the rains, as they may be early or late, causing the birds to be a week earlier or later in different years, though the birds are exceptionally punctual in their movements.

The full clutch numbers three or four, occasionally only two, but never five. The eggs are white but very soon become deeply stained, and some get so filthy that it is quite impossible to ever get them clean. The inner membrane of the egg is a very dark green.

In shape they are broad ovals, the two ends almost equal. For so large an egg the texture is fairly fine and close, with a smooth surface, quite unglossed and minutely pitted with tiny pores.

Fifty eggs average 77.3×57.5 mm. : maxima 82.8×61.5 and 80.0×64.7 mm. ; minima 70.1×54.2 and 74.6×51.5 mm.

The courtship dance of this bird is very like that of the Stork already described but the only acts of copulation that I have seen took place in lofty trees and not on the ground at the termination of the dances, though I expect this sometimes occurs. The grotesque

dance is sometimes interrupted by the birds, both male and female, exercising a few ballet steps and by picking up bits of grass, stick etc. in their bills and throwing them up in the air. The actions of the birds on the ground are a burlesque yet tragic contrast to their wonderful power and grace on the wing, especially as they soar round at an immense height from the earth.

Both birds assist in making the nest and both perform incubation, though I think the female does most of the latter.

(2213) *Leptoptilos javanicus* (Horsf.).

THE SMALLER ADJUTANT.

Leptoptilos javanicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 329.

The so-called Smaller Adjutant is a resident breeding bird in Ceylon, Travancore and parts of the Malabar coast in South-West India, while in the East it is found in the Madras Presidency, Orissa, Eastern Bengal, and in Assam. In Burma it occurs from North to South, thence it extends South through the Malay Peninsula to Sumatra, Java and Borneo and East through the Indo-Chinese countries to China.

In India outside the South-West and North-East the only breeding colony I know of is the one found by Inglis in the Duars.

The only notes in Hume's 'Nests and Eggs' refer to eggs brought to Oates in Pegu and others brought to Parker in Ceylon, both probably quite correct.

On the Ataran River, at the place described by Bingham and Tickell, both species of Adjutant bred and I have seen eggs and specimens of the bird obtained there. There are, however, numerous places in Burma where the Smaller Adjutant breeds. Hopwood (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 859, 1919) writes:— "These birds breed in several places on the Little Tenasserim River, the largest colony, consisting of about forty nests, being at Indaw village, some 60 miles south of Mergui. I first found this on December 23rd, 1917, but by that date all had hatched out and I only got one addled egg. In 1918 I was unable to reach the spot before November the 23rd, which proved rather late, as most of the broods had hatched; but I got seventeen eggs, all with the exception of one clutch very hard set. The nests are built in Kanyin (*Dipterocarpus*) trees at an immense height, fully 150 feet, and are only accessible to professional climbers, who drive previously-prepared bamboo spikes into the trunk, forming a ladder as they climb. The full clutch is four but, as often as not, three eggs only are laid."

Most of the colonies of this bird are small, a dozen to twenty pairs breeding in some single huge tree, or cluster of trees, in heavy forest, choosing the biggest and most unclimbable trees they can find.

In the early 'eighties H. A. Hole found a colony of Smaller Adjutants breeding on three or four enormous trees standing in virgin forest in some land he was clearing for tea near the Jellapur Estate on the Cachar-Sylhet borders and just below the North Cachar Hills where the ground was a good deal broken. The trees were left with a small patch of surrounding forest for the sake of the birds but in 1918 this was cleared away and only the trees left which had nests on. Now these are surrounded by Tea-land, yet the birds nest there yearly, paying no attention whatsoever to the coolies working round them. There were 15 nests in 1886 and there were still exactly 15 in 1922 and, I believe, they were still 15 in 1934. The lowest of the nests are about 40 feet from the ground, three or four others about 60 and the rest range up to at least 100 feet. They are very large affairs, measuring from 4 to about 5 feet in diameter and from 1 to 4 feet deep, according to their age. If they are not destroyed during the storms and rains of the previous year the birds are content to patch them up, adding a few more sticks and a lining of green branches with the leaves attached; if, on the other hand, they have fallen or been blown down the birds make a new nest in exactly the same spot or close to it.

The birds arrive at Jellapur in early October or the last week of September but do not lay until the first or second week of November and, if their eggs are taken, they lay again in December. The second lot of eggs are left for the birds to hatch but, once, two or three clutches of the December eggs were taken and the owners laid third clutches in January which were duly reared.

Three or four eggs are laid which are quite indistinguishable from those of the Larger Adjutant and they are, strange to say, practically just as big.

Fifty eggs average 76.4×55.3 mm.: maxima 86.2×58.0 and 75.8×62.0 mm.; minima 58.8×49.0 mm., the last a very small but fertile egg.

I visited this colony on several occasions and saw a curious habit of this Adjutant, apparently confined to the individuals of this particular group. The habit had been already reported to me by Hole. When he first discovered the nests the birds were breeding and he got some hill tribesmen to climb the trees and examine them. When first disturbed the birds all flew off their nests and circled round in the air above the trees but, as the men climbed up the trees, they returned, one bird to each nest, and from the ground below Hole could see them making jabs with their bills at the contents. When the nests were inspected each egg had a break or two in it from the beak and the white and yolk had run out into the nest. Almost every egg was treated in this way and, later, Hole found that the only way to get perfect eggs was to fire shots at intervals to keep the birds off until such eggs as he required had been brought down in safety. For my edification on one

occasion the gun was dispensed with and some eggs received with the usual stab-hole in them, rather destroying them as specimens but forming very interesting examples of the work of the birds.

The nuptial dance of the Smaller Adjutant consists of the same fantastic steps and gestures as those assumed by the Larger Adjutant. They indulge in the same counter-flapping of wings and both sexes take an equal part in the display.

Ibis leucocephalus.

THE PAINTED STORK.

(2214) *Ibis leucocephalus leucocephalus* (Pennant).

THE PAINTED STORK.

Ibis leucocephalus leucocephalus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 331.

The Painted Stork is found more or less over the whole of the Indian Empire, extending through the Indo-Chinese countries into China.

In Ceylon there are several small colonies breeding on the tanks and brackish lagoons near the coast where there are suitable trees. Bates found it breeding near Madras and gives us beautiful photographs but, alas, none of his usual full notes; Betham found a large colony near Sbolapore; Doig long ago found them breeding in Sind and Eates has very recently reported other colonies in that province; Barnes took their eggs in Rajputana; Burgess, Jerdon and others in the Deccan; Cripps in Faridpur and myself and others in several districts of Bengal and Assam.

One of the best-known colonies is that of Gobhurdhum, near Muttra. Somewhere about 1860 Hume found about 70 pairs breeding there, in 1892 Lindsey Harvey found about 200 pairs and in 1830 I was told there were "approximately 220 nests," still apparently on the same four trees, plus one or two others, as those upon which they built in Hume's time. Hume writes: "*January 24th.*—'There were perhaps 70 nests on four trees,—three tamarinds and one peepul—in the immediate neighbourhood of this village. The nests were loose ragged platforms, composed of thin sticks and twigs and small for the size of the bird. At the time we visited them young were standing in each nest.' In a later year, on September 22nd, he found that only two or three birds had laid their first egg. Then some years after Blewitt visited the colony on the 26th October and found many nests with incubated eggs and adds the information that the largest and smallest number of eggs or young in a nest was four and two respectively. Finally, in 1874 Whitton reported that in the middle of October the nests in this colony contained eggs and that Hume's 70 nests had increased

to 200. He says that "they were made of dry twigs of kurreel, chowkner, plum, tamarind etc., as many as twenty nests were found on one tree," and that they measured about "2 feet in diameter and weighed 5 or 6 lbs." To this all that can be added is that the nests were high up, varying from 30 to 50 feet or more from the ground and that the trees on which the nests were built were adjoining a large pond in which fish and frogs were numerous.

In contrast to this colony of nests high up in big trees are the colonies found by Eates and Doig, apparently consisting of 40 or 50 pairs of birds with nests "on decayed trees about 6 or 8 feet above water-level" (Doig) or "Keekur-trees and Acacias standing in water some feet deep, the nests only a few feet above the surface of the water" (Eates).

The Painted Storks often breed in company with other birds, such as Herons, Egrets, Cormorants etc. and all those I have seen have been so situated, although the nests of the Storks were all by themselves and not mixed up with the others, which at the time were unoccupied. They are common birds in Eastern Bengal in Mymensingh, Dacca and Barisal and breed there in the huge swamps and nearly always on trees either in the water or, more often, standing on the little knolls, a hundred yards or so across, on which the fishermen have their huts surrounded by trees. The birds show no fear of man and go about their nesting, incubation etc. while the people below attend to their daily duties.

The normal breeding season is October to December, while in Ceylon Wait says it is "in the early part of the year. In Sind they breed in January and February and in Sholapore Betham also found fresh eggs in January.

Sometimes, perhaps, consequent on early rains, the birds breed earlier than usual and in 1892 Harvey found that even in Gohurdhum the birds all had eggs on the 10th September. The full clutch is three to five eggs and the clutch of eight eggs reported to Hume, if correct, was probably the production of two females.

The eggs are quite typical Storks' eggs, white, not nearly so badly stained as some others and, in shape, are rather long ovals, varying from this to moderate oval. The texture, for so large an egg, is rather fine and close, with the surface smooth, though glossless.

Fifty eggs average 69.5×49.0 mm. : maxima 80.2×51.6 mm. ; minima 65.3×46.0 and 65.4×43.2 mm.

Both birds incubate and both make the nest, but I have no information as to length of incubation; nor have I ever seen anything of the nuptial display beyond a few steps and a mutual flapping of wings and, even this, not close together so that the wings touch as flapped.

(2215) *Anastomus oscitans* (Bodd.).

THE OPEN-BILL.

Anastomus oscitans, Fauna B. I., Birds, 2nd ed. vol. vi, p. 333.

This common, but far from beautiful, little Stork is found in suitable places all over Ceylon, India and Burma and thence into Siam and Cochin China.

The two essentials are trees of some kind on which to build and water close by where they can get their food. Sometimes the colonies are small but, more often, large and sometimes very large. One colony, which I found breeding in North Lakhimpur, in Assam, consisted of many hundreds; another colony, or collection of colonies, in Barpeta must also have been of some 360 or 400 pairs, but they were broken up into four or five batches, numbering from 50 to 150 pairs. At the same time many writers mention quite small colonies and I also have seen some of about 20 or 30 couples.

Under the heading of *Herodias alba* Hume gives a wonderful description, quoted from an anonymous correspondent, of a large tank or sheet of water some 50 miles from Madras (Hume's 'Nests and Eggs,' vol. iii, pp. 237-9). This is referred to by Bates in his 'Bird-life in India' and the place was repeatedly visited by him and much valuable information given about many species. About the Open-Bill he notes:—"I cannot agree with Hume's informant that the Open-Bills make communal structures, though a few (of the nests) touched one another.

"Another point with which I also disagree is Hume's remark that the Open-Bill does not mix with other species. In one Open-Bill's tree Little Cormorants' nests were actually touching those of the Open-Bills. These Cormorants' nests had small young ones in them, whereas the Open Bills' belonged to a new colony which was only just laying. Another tree in which were Open-Bills' nests likewise contained nests which had obviously been there when the Open-Bills commenced operations, as close to, and on a level with, two nests containing small young ones were two Herons' nests with feathered inhabitants. Incidentally, whereas the nests of other species were both on the outer surface and within the trees, the Open-Bills' nests were invariably open to the sky and practically at the summits of the highest trees available. A few were half-way up, but this was because the top portions were already occupied by other Open-Bills."

As a matter of fact they seem to adapt their fancies to the sites available. In North Lakhimpur the huge colony to which I have referred kept entirely to themselves and occupied vast numbers of tall palm-trees in a long straggling village in which there was much tree-growth, while all round were grass-lands and a certain amount of cultivation. Almost every palm-tree in this village had at least one nest of the Open-Bill and a few two or even three nests

jammed together in the crown but no other bird built in them except some Baya-Birds. Many other Water-birds were in the village and breeding. A grove of Mangos was tenanted by many Herons and Egrets and a few Cormorants. Two or three Tamarind-trees were also occupied by a miscellaneous lot of Egrets, Cormorants and Snake-Birds, but the Shell-IBises—or Open-Bills—consorted with none of these.

In Barpeta, however, the reverse was the case and, though each species seemed to have certain trees or portions of trees in which they predominated, all sorts of other species bred with them. In about half a dozen large trees, or bunches of trees, wide apart from one another, there were colonies of these birds occupying the summits, the nests often so crowded that they touched one another, and in some cases, there being no more room on the top floor, the birds had to be satisfied with rooms in the lower flats, which were mainly occupied by Egrets, or, even, the ground-floor, where the Cormorants and Darters seem to breed by preference.

Field also found a colony breeding in a Mango-grove in Oude, where about 60 pairs of Open-Bills kept the place entirely to themselves. Packard again, near Chinglepat in Madras, found a small colony of 25 pairs breeding alone in some trees in the centre of a village. It seems evident, therefore, that, though Open-Bills prefer, as a rule, to keep to themselves, they can, at a pinch, put up with the close neighbourhood of those whom they deem to be their inferiors.

Bates gives some examples of what he terms Open-Bills' trees :—
 " This had the following nests distributed about its surface. A Spoonbill's with three fresh eggs in it ; another with two ; five Open-Bills' on the summit of the tree, all with newly hatched young ones ; a little to one side and slightly lower, four more Open-Bills' with two to four eggs. Immediately above the Spoonbills' nests were two more Open-Bills', one empty, the other with two eggs. At one side of the tree, adjacent to the group of four Open-Bills', were a number of Night-Herons' nests and eggs and, sprinkled generally all over, were many Little Cormorants' containing both eggs and small young ones, two of them actually touching Open-Bills' nests. The date was February 16th."

Bates argues in some cases that because other birds than the Open-Bills had their domestic arrangements further advanced, therefore the Open-Bills rather than the other birds were the interlopers but, as all these trees had been occupied for many many years, it is quite possible that the Open-Bills were the first occupants of these particular trees and the numbers of the others had gradually increased from year to year.

It is curious how little worried Water-birds are by human beings residing and working all round them. Elsewhere I have given a description of a heronry within a stone's throw of a railway junction station and again I have seen colonies of Open-Bills and

many other species nesting right in the middle of villages and occasionally even of large towns and cities, yet one also sees other colonies built far away from all signs of humanity in the wildest and most inaccessible swamps and grass-lands.*

In Northern India and in Burma the Open-Bill, together with most of the birds which associate with it, does not breed until the rains have well set in and, with its advent, frogs and other reptiles and fishes have become abundant. Most birds breed in July and August while a few others lay as late as September or as early as June. In Southern India, however, they breed from December to February.

In all heronries, especially large ones, one finds the same species of bird in various stages of breeding; some with young, big or small; some with eggs, fresh and incubated, and others only just starting making or repairing their nests. Often the variation may cover as much as three months. In small colonies, however, the individuals usually all lay at about the same time, a difference of some ten days or a fortnight covering the earliest and latest.

The Open-Bill lays from three to five eggs, the latter not often, while, on the other hand, two eggs only are sometimes incubated.

The eggs are quite typical of the family; broad to moderate ovals, seldom pointed at the small end; the texture is fine and close and the surface glossless but often soapy and smooth, this being even more noticeable than in most eggs of Storks.

One hundred eggs average 57.9×41.2 mm. : maxima 60.4×40.6 and 63.1×45.2 mm. ; minima 48.3×38.2 and 56.1×36.4 mm.

Both sexes build the nest and both incubate, the male doing at least as much of the work as the female. Incubation, I think, takes about twenty-four to twenty-five days but, perhaps, varies to an even greater extent than this. Witherby, I notice, gives the incubation period of the White Stork as from twenty-eight to thirty-eight days, a most extraordinary range of variation.

I have never seen this Stork indulge in the wing-flapping which constitutes the form of advance made to the opposite sex and there seems to be no account of the nuptial dance recorded.

Suborder A R D E Æ.

(HERONS and BITTERNS.)

Family ARDEIDÆ.

(HERONS and BITTERNS.)

Ardea purpurea Linn.

THE PURPLE HERON.

(2216) *Ardea purpurea manillensis* Mayen.

THE EASTERN PURPLE HERON.

Ardea purpurea manillensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 337.

The Eastern race of Purple Heron breeds over the greater part of Ceylon, India and Burma and is found eastwards through the Indo-Chinese countries to the Philippines and Celebes.

Wherever there are vast swamps or lakes with reedy shores or reed-beds there the Purple Heron will be found, often in vast numbers, if one considers those found in the whole area, yet never, I believe, in very large colonies in any one particular spot. In Assam I have seen swamps and lakes on which there must have been many hundreds of birds breeding, yet I do not remember ever seeing any colony of as many as fifty pairs of birds, and most of them consisted of a dozen or twenty, some even less. This is the position in a swamp, or series of swamps, in the Goalpara district. Here, also, many hundreds of pairs breed annually, yet Primrose, who lived many years at Mornai, close to the largest swamp and lake, says that "in some patches of reed there were half a dozen nests, in others only one or two, whilst in one bed of reeds there must have been at least fifty nests."

Oates gives a description of a Burmese swamp which would suffice for many others, either in Burma or elsewhere. "The Sittang River at a place near Myitkyo forms a peninsula 5 miles long and 2 miles broad. The whole of this area is one vast dismal swamp, the chief feature of which is a gigantic reed called *Kya* by the Burmese. This swamp in the rains becomes the resort of myriads of birds. It is possible to enter the swamp only during the highest floods, for otherwise the reeds offer too great a resistance to a canoe, and at the best the progress by poling is not more than 200 or 300 yards an hour."

The number of nests of all sorts met with is marvellous. "In pushing along the young fall, and the eggs roll into the canoe and in some parts there must be a nest either of a Heron, Bittern or Cormorant on every square yard of reeds. Three nests frequently touch each other.

"The most numerous species is, perhaps, the Purple Heron. It constructs a nest of sticks and the broken branches of the reeds, about a foot in diameter and eight inches deep, nearly flat at top, and lays four eggs. The nest is placed about four feet above the water, resting on three or four reed-stems which they or the wind have bent towards one point."

Increase somewhat the area of open water and correspondingly decrease the area of the reed-beds and Oates's description would apply well to any one of the dozen or more heronries and swamps I know in Assam. One difference might be noted, and that is that the birds in Assam nearly always broke down a great many reeds to form substantial platforms for their nests, the smashed-down bed of reeds often affording room for three or four nests. They also built wider yet more shallow nests. I should have guessed the average width of the nests to be over 18 inches and the average depth under 6, while some of them were much larger still.

Undoubtedly reed-beds form the favourite resort of the Purple Heron but I have found them nesting on small trees even in the middle of these swamps, and a small colony of some eight or nine pairs had their nests, on a small island in the middle of a swamp, all built on bushes and scrubby trees four to eight feet above the water.

Sometimes they breed habitually on trees, as in Sind, where Scrope Doig and Butler found them breeding on tamarisk-thickets "standing out of the water of a large dhand-like island, swarming with Purple Herons and other species of the same family."

As a rule I think the Purple Heron does not care to breed in company with other birds, either Herons or others, and Hume says that such is his own experience. I have known Purple Coots to breed in the same clumps of reeds, while Oates, as already quoted, found them mixed up in Pegu with a vast assortment of other birds.

In Ceylon Legge records that he found the Purple Heron "nesting on the shores of Bolgodde Lake in the Western Province in December and on the banks in the south-east of this island in February and March. The nests were made on huge screw-pines (*Pandanus*); in the latter district on bushy, thorny trees." Wait adds to this that in favourable monsoons the birds breed again in June.

In Travancore Stewart and Bourdillon obtained fresh eggs in July and September and elsewhere they breed as soon as the rains have set in, about July, and continue until late in August and early September. When the rains are exceptionally early and heavy eggs may be taken in the end of June.

The normal full complement is four eggs; three or five are quite common and I have seen six.

Though Hume calls it coarse, the texture is comparatively fine and close, while the surface is smooth, without gloss. In shape the eggs are broad to moderately long ovals, never compressed at the smaller end. The colour is pale sea-green or green-blue, varying to a considerable degree in depth but never so pale as in some of the Egrets and never nearly as dark as in those of the Glossy Ibis.

One hundred eggs average 54.6×39.7 mm. : maxima 66.3×41.4 and 61.0×44.4 mm. ; minima 50.0×40.0 and 52.1×38.1 mm.

Both sexes incubate and both share in the task of nest-building. Incubation takes about twenty-four days. A colony visited on 3rd July, all the nests with eggs but some with incomplete clutches, had all hatched out on the 29th, one or two nests, those probably with incomplete clutches at the first visit, with young just hatched; the others in different stages up to nearly three weeks old.

Ardea cinerea Linn.

THE COMMON GREY HERON.

(2218) *Ardea cinerea rectirostris* Gould.

THE EASTERN GREY HERON.

Ardea cinerea rectirostris, Fauna B. I., Birds, 2nd ed. vol. vi, p. 340.

The range of this Heron extends from Mesopotamia and Persia south to Ceylon and east through Burma to China, Hainan, the Philippines etc.

The haunts of this Heron are the same as those of the Purple Heron but it almost invariably nests on trees, often at a considerable height from the ground or water, and it does not collect in colonies of its own kind, though it seems to prefer to place its nest among those of other birds which do so breed.

In Assam I found it nesting in the same swamps as those in which I found colonies of the Purple Heron but, with one exception, they were single nests dotted about here and there among those of other birds. The one exception was a group of half a dozen nests on a tree growing on the outskirts of a village and standing, during the height of the rains, in about two feet of water.

Bingham also found what was presumably a colony of this bird "breeding near Delhi at the end of March. There were some twenty nests on large trees in and about the village of Burari on the Jumna."

Butler and Scrope Doig found it breeding freely in the Egret colonies in the Eastern Narra in Sind. The former writes:—"The breeding ground consisted of a dense thicket of tamarisk-

trees extending over several acres of ground in the middle of a large dhund. The Herons and Egrets seemed to breed together promiscuously."

Butler does not say if the Herons were in colonies, but I presume not, as a recent correspondent from Sind speaks of "odd nests of the Grey Heron dotted about among the others at rare intervals." Doig also found "a quantity of Herons breeding in a dense bed of tall bulrushes at the side of a tank at Milana, 18 miles east of Deesa." The only other instance I know of where the birds nested in rushes was a small bunch of three nests found by me in dense matted rushes in the Dimaji Bheel, but it was noticeable that the nests were nearly 6 feet above the water.

In Ceylon they breed from December to March; Blewitt obtained eggs near Hansie in the end of March and Hume had eggs sent him from Saugur in April and June, while Lindsey Harvey sent me eggs from Muttra, taken on the 29th March. In Northern India it would seem that a good many birds breed in March and April but that the great bulk lay during the rainy season from July to September. In Assam, certainly, the majority lay in August.

In Bates's account of the famous Vedan Thaugal tank he says that on December 29th many Herons' eggs had hatched and some were getting feathers.

The full clutch of eggs is three or four, more often the former.

They agree in all respects with those of the Purple Heron but may average a little darker.

One hundred eggs average 58.6×43.5 mm. : maxima 68.4×43.1 and 63.1×46.8 mm. ; minima 54.3×41.6 and 56.4×39.7 mm.

(2220) *Ardea imperialis* Stuart Baker.

THE GREAT WHITE-BELLIED HERON.

Ardea imperialis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 342.

This grand Heron extends from the Sikkim Terai to Assam and Northern Burma. This seems to be a bird of swamp and sub-montane grass-land along the Terai, much of it still almost impenetrable, while it may also possibly ascend the hills to 5,000 feet or a great deal higher. Two eggs were sent to me from Sikkim said to have been of this bird, both being small addled eggs taken from nests containing chicks, but I much doubt the correctness of their identification. The only nest and eggs about which there is no doubt are those taken by Mr. W. S. Thorn on the Temru River in Arakan some time in April. The nest was a huge stick affair built high up in a tall tree and contained four eggs, two of which were given to C. Hopwood and later came into my possession.

They only differ from the eggs of the Grey and Purple Herons in their great size, measuring 70.2×50.8 and 69.2×49.9 mm.

Egretta alba.**THE LARGE EGRET.**(2223) **Egretta alba modesta** (Gray).**THE EASTERN LARGE EGRET.***Egretta alba modesta*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 346.

The Eastern Large Egret breeds throughout India, Burma, Ceylon and through the Malay Peninsula and islands to Australia.

This beautiful Egret breeds all over its habitat in suitable places but in smaller numbers than most of its tribe. Heronries exist everywhere from Sind to Assam and from the North of the United Province to the South of Ceylon, whilst others are dotted about from North to South of Burma.

Almost everywhere it breeds in company with other Herons, Egrets, Cormorants etc. sometimes the colony keeping to itself in a selected tree, so far as any colony can keep to itself in such a babel of birds, but, more often, placing nests here and there in all parts of the colony, sometimes singly, sometimes two or three together.

At one colony I visited very often for several years, the birds selected a Tamarind-tree alongside a fairly large Mango-grove. The latter was, in the breeding season, alive with many kinds of Egrets, Cormorants etc., but the Large Egrets, about eighteen in number, kept the Tamarind-trees all to themselves, though one year some Cattle-Egrets joined them. Not far from this was another colony of nests of many birds in another Tamarind-tree and some clumps of bamboo; in this no attempt was made at isolation, the nests being built in among the others both on the tree and in the bamboos.

In Sind Butler and Doig found the same, and the former writes:—"Mr. Doig and I found large numbers of this Egret breeding in the E. Narra, Sind, at the end of July, 1878. The nests were scattered about promiscuously amongst the nests of numerous other species and not built in separate colonies."

In Ceylon, also, Legge found them breeding in company with other Herons and Egrets "on the lateral branches of low thorny trees."

Hume's anonymous correspondent, whose notes on the Vedan Thaugal tank have already been referred to, gives a good pen-and-ink picture of this wonderful resort of Water-birds:—"The area comprised in the tank is about 35 acres.

"From the north-east to the centre of the tank there are some five or six hundred trees of the *Barringtonia racemosa*, from about ten to fifteen feet in height, with circular, regular, moderate-sized crowns, and when the tank fills, which it does during the monsoons, the tops only of these trees are just visible above the level of the water.

"This place forms the breeding resort of an immense number of Water-fowl,—Hérons, Shell-Ibises, Ibises, Cormorants, Darters and Paddy-birds, etc., make it their rendezvous on these occasions.

"From about the middle of October to the middle of November small flocks of 20 or 30 of some of these birds are to be seen coming from the north to settle here during the breeding season. By the beginning of December they have settled down; each tribe knows its appointed time, and arrives year after year with the utmost regularity within a fortnight later or earlier, depending partly on the seasons. They commence immediately by building their nests or repairing the old ones preparatory to depositing their eggs. When they have fully settled down, the scene becomes one of great interest and animation.

"During the day the majority are out feeding and towards evening the birds begin to arrive in parties of ten, fifteen or more, and in a short time the trees are literally covered with bird-life: every part of the crown is hidden by its noisy occupants, who fight and struggle with each other for perches. Each tree seems like a moving mass of black, white and grey, the snowy white plumage of the Egrets and Ibises contrasting with, and relieved by, the glossy black of the Water-Crows and Darters and by the grey and black plumage of the Ibises."

Such a description would suit any one of the largest of our bird-resorts or, indeed, with the necessary modifications, our smaller ones also.

Sometimes two or three of these Egrets will nest all alone. I have seen such in Assam but, generally, when there was a colony of these and other birds not far distant. Bingham says that he "found two or three nests of this large Egret in July near Allahabad."

The nests are just the usual Herons' platforms of sticks, roughly and loosely made and sometimes lined with grass or rushes. They are used again and again until blown down or otherwise destroyed, the repairs being of the slightest and crudest. They vary a great deal in size. I have seen some not more than 8 inches across and very flimsy and shallow, 2 or 3 inches deep, while others may measure as much as 2 feet in diameter and 6 to 10 inches or more in depth.

In Ceylon and the South of India these Egrets breed from October, rarely, to January and in smaller numbers as late as February. In Northern India they nest chiefly after the start of the rains in July, August and September.

The full complement of eggs is three or four, usually the former. They differ from those of the Grey and Purple Heron only in their smaller size.

Sixty eggs average 54.0×38.6 mm.: maxima 60.5×39.3 and 58.1×40.6 mm.; minima 48.5×37.2 and 53.0×35.9 mm., while an abnormally shaped egg measures 57.0×32.7 mm.

Both sexes incubate and both assist in building the nest.

Egretta intermedia.**THE SMALLER EGRET.**(2224) *Egretta intermedia intermedia* (Wagler).**THE INDIAN SMALLER EGRET.*** *Egretta intermedia intermedia*, Fauna B. I., Birds, 2nd ed. vol. vi, p. 347.

This is the most common of our White Egrets and is also the one with the widest distribution. It is found in Ceylon, all India, Burma, the Malay Peninsula to the Philippines and East to the Indo-Chinese countries, China and Japan.

This Egret breeds in the same kind of places as the other Herons and Egrets and very often in company with them, though usually somewhat apart and the individuals of the species all together in one tree or group of trees. This, however, is not always so. Hume describes a colony in Etawah as follows:—"A small Mahomedan graveyard in which stood a few old tamarind-trees, and on these in my time, that is to say from 1856 to 1866" (I believe they are still there), "hundreds of the three species above mentioned used every year to breed. On one tree we counted 198 nests, the greater number of which were occupied. On one nearly horizontal bough we counted in a length of 21 feet eighteen nests, all side by side on the flat surface of the bough, with barely room in most cases for one bird to stand between two nests, and with no room at all in some. We computed that on these few trees not less than 700 pairs of birds had nests. The three species did not appear to have quarters of their own in this heronry, as I have often noticed in others, but were all jumbled up together indiscriminately. Year after year I watched. They began to repair their nests after the first good downpour of the rainy season, that is, some time between the 1st June and 1st July; the first eggs were laid within a fortnight, and in another three weeks almost every nest had its full complement of four eggs.

"The nests are precisely of the same type as those of the preceding species, but are smaller (on the average I should say a little less than a foot in diameter and 3 inches in thickness) and are composed of more slender twigs. Generally they are unlined; sometimes they have a thin lining of sedge and coarse grass."

Bingham says that in Allahabad he has seen them breeding both alone and in company with other Water-birds, while at Deesa Butler found them nesting in the reeds in company with the Purple Heron, the nests mixed up indiscriminately. In Tinsukia I found them breeding in company with Pond-Herons and other birds. The Smaller Egrets were all together on one tree but many Cattle-Egrets were on the same, though the majority of these and of the

other birds were on adjoining trees and bamboos. In another colony nearby these Egrets had a bamboo-grove all to themselves.

In Northern India they breed from the end of June up to the end of September but, when the rains are early in Assam, as they often are, many birds of this and other species of Herons breed in May.

I think four eggs are laid more often than three and I have found two hard set and very rarely five. They are just like small Herons' eggs, but occasionally a clutch may be seen which is very pale, contrasting quite strongly with the normal coloured egg. In shape they are rather broader ovals than are the eggs of either the Grey or Purple Heron and the surface is very smooth.

Sixty eggs average 47.6×35.8 mm. : maxima 52.8×36.1 and 50.1×38.6 mm. ; minima 42.6×35.0 and 48.0×33.1 mm.

Both sexes incubate and both construct the nest but this is common, apparently, to all the Herons and Egrets.

Incubation, I think, takes twenty-one days, but I have not exact information.

Egretta garzetta.

THE LITTLE EGRET.

(2225) *Egretta garzetta garzetta* (Linn.).

THE LITTLE EGRET.

Egretta garzetta garzetta, Fauna B. I., Birds, 2nd ed. vol. vi, p. 348.

The Little Egret is resident and breeds all over Ceylon, India and Burma. West it occurs in South Europe from Spain to Russia, over nearly the whole of Africa and Madagascar, while East it extends to China and Japan.

It is difficult to find anything to say of this Egret which has not been said of that whose nidification has already been described. They breed in colonies in the same kind of places and in company with those already dealt with and they make the same kind of platform-nest of sticks, generally unlined but, sometimes, with a rough and meagre lining of grass or rushes.

The colony at Tinsukia, in Lakhimpur, to which I have already often referred, may be described as quite typical of the great number I have seen. The main mixed colony, which included Herons, Egrets of various species, Cormorants etc., were breeding on one great Tamarind-tree, a few Mango-trees, a little apart from the rest, and a large surrounding grove of bamboo clumps all alongside a reed-edged, weedy tank of no great size. Within a hundred yards was a busy railway junction and all round were village houses, school etc. In the tank washermen washed and all sorts of people bathed ; in the school the boys and girls recited their lessons out loud in unison and all round the village carried on its usual business. All

this interested the various birds not one scrap and they courted, mated, built their nests, laid their eggs and quarrelled in exactly the same way they would have done had there been no vestige of humanity within miles of them. The Smaller Egrets shared a tree with a small number of Cattle-Egrets and had a few nests in among the other birds who, for the most part, built their nests here, there and everywhere without regard to who their next-door neighbour might happen to be. The Little Egrets, however, were, to the number of about 40 nests, on a Mango-tree standing rather apart and on which the only other nests were a few of the Smaller Egrets. Elsewhere another 40 or so nests were built in the general heronry, sometimes in little clumps of two to five together, at other times singly.

This trait of liking to build their nests in a group more or less isolated from the other birds of a colony seems common to them. The colonies are often very big and I have myself seen several hundred nests in a colony more than once, while Doig says that he found them breeding in Sind with other Herons and Egrets "in countless numbers." Here they were breeding on partly submerged Tamarisk-thickets quite close to the water, some within 4 or 5 feet of it.

As a rule undoubtedly they keep to trees and bamboos for nesting but I have more than once seen small colonies breeding in dense beds of reeds and elephant-grass, making their nests on platforms of broken-down reeds or grass within a few feet of the water. Oates also says that in the great Myitkyo swamp these Egrets breed with the Purple Herons and other birds in reed-beds.

Layard gives a most interesting account of a Heron breeding-ground in Ceylon, from which I extract the following:—

"Half-way between Tangalle and Matura is a large lake. . . . The canoe was about 12 feet long, worm-eaten throughout, and one end entirely gone, its place being supplied with a piece of fresh turf to keep out the water. Into this I and Matta and a steersman got. I could count a dozen alligators, all man-eaters. It was full breeding season. Herons, Spoonbills, Ibises, Pelicans, etc., swarmed in the air and on the trees, while their nests were so crowded as to touch each other.

"I could only get a few of those nearest the lake; up to them the men climbed from the boat, not daring to venture into the water, which was alive with alligators watching for the young birds which fell from the nests; several times they snapped up the birds which I shot before I could get to them. The branches of the trees were white with droppings and the water below thick and putrid; the stench was intolerable. The nests seemed to be used year after year, if one may judge from the masses of sticks of different ages of which they were composed. My guide confirmed this and said the birds were not particular as to the nest—one species occupying it one year, another the next perhaps.

"Unfortunately most of the eggs were hard set. I was there at the beginning of May."

This seems to be the usual breeding time in Ceylon and Southern India, as Davidson says that in Kanara the breeding season is April.

In Northern India the middle of June to the end of August is the normal laying season, most eggs being laid in July. When the spring rains are unusually heavy in Assam some colonies will commence laying in May.

The number of eggs in a full clutch is three to five, which are of the usual blue-green colour, broad oval shape and fine smooth texture.

Sixty eggs average 44.4×31.7 mm.: maxima 49.0×32.0 and 44.0×34.1 mm.; minima 40.3×31.9 and 43.7×30.8 mm.

Bubulcus ibis.

THE CATTLE-EGRET.

(2226) *Bubulcus ibis coromandus* (Bodd.).

THE INDIAN CATTLE-EGRET.

Bubulcus ibis coromandus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 349.

With the exception of the Pond-Heron, the Cattle-Egret is the best known of all forms of the Herons and Egrets in the Indian Empire, being found all over Ceylon, India and Burma, whence it extends through Siam and the Malay Peninsula to the Philippines, Moluccas and Korea.

Except for the fact that this Egret is not so entirely dependent on an ample water-supply, its breeding habits differ in no way from those of the other Herons and Egrets with which it often nests in mixed colonies.

As a rule it breeds by water of some kind. It may be a village pond a few square yards in size only, or it may be one of the great swamps. Probably it prefers village ponds to any other situation and constantly breeds in the middle of villages and towns and often in gardens where there are small ponds and suitable trees. Sometimes it breeds in Mango-orchards or in other village trees some distance from any water and, in such cases, the colonies contain only Cattle-Egrets and no other species, as these latter almost invariably require water close at hand.

Most of the colonies are not very large. Butler found a colony of twenty or thirty pairs breeding in Sind in company with the Pond-Heron, though he says the latter had eggs on the 26th May and the former on the 18th July. Inglis, Coltart, Harvey and others found colonies in Bihar generally numbering twenty to fifty pairs; in Assam and Bengal most of the colonies I knew numbered about the same but one or two were much bigger. One colony, composed entirely of Cattle-Egrets, contained over 400 nests, they were

almost impossible to count as they covered one another from sight, but this was the certain minimum. Adams also speaks of a colony on the Sambhur Lake "in which some hundreds of birds had their nests."

The nests cannot be distinguished from those of the Little Egret or the Pond-Heron.

Over all Northern India and Burma the Cattle-Egret only breeds after the rains have started, most eggs being laid in July and August, but some in every month from June to September. The following months have been recorded for their breeding in various places:—Sambhur Lake, June and July (Adam); Deesa, July and August (Butler); Sind, July (Doig) and August (Bulkley); Allahabad and Delhi, July to September (Bingham); Lucknow, August (Reid), June to September (Jesse); Bihar, June to August (Inglis and Coltart); Assam, May, rarely, June to September (Primrose, Inglis and myself); Gaya and United Provinces, July (Field).

In Southern India it seems to breed in December and January and in Ceylon Legge gives January to March as the nesting season.

The eggs, three to five in number, can be distinguished from those of any other Egret by their very pale colour, the blue-green being so pale that it sometimes looks white.

Eighty eggs average 44.1×33.6 mm.; maxima 48.5×32.0 and 45.1×35.1 mm.; minima 41.4×33.8 and 48.5×32.0 mm.

In shape they are even broader ovals than most eggs of Herons.

Both sexes incubate and the male does at least his full share and also helps to build the nest. Incubation takes twenty-one to twenty-four days.

Demiegretta sacra.

THE REEF-HERON.

(2227) Demiegretta sacra sacra (Gmelin).

THE EASTERN REEF-HERON.

Demiegretta sacra sacra, Fauna B. I., Birds, 2nd ed. vol. vi, p. 351.

The headquarters of the Reef-Heron are in the Andaman, Cocos and Nicobar Islands. Hopwood and Shopland also found them breeding in Oyster Island off the Arakan coast, while they also breed on some of the islands off the Malay coast.

Many years ago Davison gave a description of the breeding of the Reef-Heron in the Andamans and, some forty years later, in 1897, Osmaston revisited it and, as his description (Journ. Bomh. Nat. Hist. Soc. vol. xiii, p. 151, 1900) is even fuller than Davison's, I quote it *in extenso* :—

"The Reef-Heron is common along rocky portions of the Cocos, Andamans and Nicobars.

"The Port Blair birds all breed on Snake Island, Corbyn's Cove, laying at the same time as the Terns, which also breed there.

"Snake Island is a tiny rocky islet a few hundred yards from the shore, about three miles outside Port Blair harbour. I paid a visit to this breeding place on the 14th May. In the centre of this island the rocks form a craggy mound some twenty feet high, covered with a few stunted trees—a *Hibiscus* and a *Ficus* of sorts—and here and there about the island were growing a few scrubby bushes (*Pomphis acidula*). The rest of the island was bare rock strewn with coral débris.

"As I landed a crowd of Terns rose and wheeled about me with startled cries, while with croaks of disgust the Reef-Herons left their nests among the rocks and trees and betook themselves to a neighbouring reef. Wishing to make the most of this opportunity of observing the birds I esconced myself in a crevice in the rocks, where I was completely concealed by the foliage of the *Ficus*.

"All round me were numerous nests of the Reef-Heron, some in the hollows and crevices of the rocks, and some among the branches of the trees in which I lay hid. Most of the nests contained two or three eggs, the birds having only just commenced to lay. Fifteen yards in front of me were a few scattered eggs of the Terns which, having seen me get into my hiding-place, hovered over me, 'mobbing' me vociferously. I remained perfectly still, the Terns descended to their eggs, and the Herons came back from their reef and settled fearlessly about their nests on the rocks and branches within a few feet of me. One of the white birds, usually so shy, perched so close to me that I could almost have touched it with a stick, and remained during the whole hour I lay concealed. The Reef-Herons seemed very apathetic, sitting quite motionless and now and then yawning sleepily. I noticed some of them breaking off the green twigs of the *Pomphis acidula* to line their nests with."

Osmaston does not describe the nests on this occasion but, later, he took many other nests, in the Andamans, built of sticks, rough platforms, placed on Mangrove-trees in creeks only just above high-water mark.

Davison also describes the nests as "simply platforms of sticks with a slight depression for the eggs." Shopland found them breeding on Oyster Island, where there were eight or nine nests built in a patch of "thorny jungle near the centre of the island. The nests were from one to three feet from the ground, and were composed of dead sticks and leaf-stalks. No nest contained more than three eggs."

Hopwood also visited this colony, but found the birds breeding in the scrub on the edge of the island and not in the middle of it.

Davison was told by the natives that on Trinkut Island the birds bred on Cocoanut-palms, but neither Osmaston, Wickham nor Anderson seem to have met with such nests. —

A series of eggs sent me by Osmaston were taken between the 21st May and 7th July, but Wickham obtained eggs as late as September.

The eggs are typical Herons' eggs in colour, texture and shape and could not be distinguished from those of the smaller species of Egrets.

Fifty eggs average 44.8×33.3 mm.: maxima 48.1×33.2 and 44.4×34.1 mm.; minima 42.5×31.8 and 47.5×31.7 mm.

(2228) *Demiegretta asha* (Sykes).

THE INDIAN REEF-HERON.

Demiegretta asha, Fauna B. I., Birds, 2nd ed. vol. vi, p. 353.

This Reef-Heron is found from the Persian Gulf all along the shores and islands of the Western coast of India to Ceylon and the Laccadives. Hume says it is also found up the East coast of India "as far as Paumben."

Eates has a most admirable account of the nesting of this Heron (Journ. Bomb. Nat. Hist. Soc. vol. xxxi, pp. 823-5, 1926), so complete that it leaves little more to be written about them:—

"I have closely observed the nidification of this species of Reef-Heron in Karachi for four successive years.

"For season after season for three years the birds chose two definite sites, a straggling belt of trees bordering an old burial ground and a Public Garden, both situated in the heart of the native quarters of the City, about a mile away from salt water.

"Both Heronries were discovered in early May 1923, the site being given away by the throaty squawkings of numberless fledglings clamouring for their never-ending meal of fish.

"A score or so of very hard-set eggs were obtained on this occasion.

"During the two following years the birds again chose these sites, and a series of fresh and slightly incubated eggs were collected on March 22nd, 1924.

"In 1926 the birds were obliged to abandon the burial-ground site, which had been taken forcible possession of by large numbers of the common House-Crow, evidently attracted by the cattle tethered, for the first time beneath the trees.

"Pipal (*Ficus religiosa*) and Ber (*Zisypheus jujuba*), Portia (*Thespesia populosa*), Inga Dulcis (*Pithecolabium dulce*) and Jamblo (*Eugenia jambolasia*) were the trees chosen by nesting birds, the two first being particularly favoured. Nim (*Azadirachta indica*) trees were left severely alone for nesting-sites, though some birds were noticed carrying small dried twigs off which the leaves had fallen.

"Generally speaking, birds paired off and commenced building in the first week in March. Courting preliminaries consisted of the

male offering his mate a freshly-picked leaf or twig, which was accepted, played with and then allowed to fall to the ground. This performance would be repeated again and again, till the birds, evidently tiring, would remain perched close to one another and at intervals preen themselves.

"Early birds were content with building an ordinary, typically heron-like stick-nest on the tree chosen by them, but numbers of birds building on Pipal, after the appearance of new leaves, constructed a leafy and unique type of nest, photographs of which are appended.

"Both types of nest vary in bulk and shape and consist of a fairly stable platform-like structure of sticks lined with green leaves, upon which three or four eggs are laid. The birds are of uncleanly habits, and nests after a week's occupation have anything but a sanitary odour or appearance.

"In the third week most birds were found sitting close on young or hard-set eggs, and by the end of the fourth week numbers of fledglings were seen sitting loutishly on the edges of their nests eagerly awaiting their diet of disgorged and evil-smelling sprats. Great excitement and a general uproar of throaty squawks, harsh quacks, hoarse gurglings and high-pitched screams, accompanied with furious flappings of wings, noisily heralded the arrival of every bird returning to the colony with a well-filled gullet of fish to appease the voracious appetite of its young.

"During my visits to the heronries birds were often seen mating, the female passive, crouching low on the branch across which she sat, while the male completed the act with the usual flapping of wings.

"On March 19, 1924, there were about two hundred birds nesting among the topmost branches of lofty Pipal-trees; a few nests, however, were placed on Jamblo, Ber and Inga Dulcis trees.

"The majority of the birds were slaty, not more than half a dozen pairs of the white variety being noticed. About half the colony were sitting close, the remainder busy building, nests being well advanced. Those on Pipal were in most cases made from Pipal-branches *with the leaves still on*. Freshly built nests had a most singular appearance, the green leaves forming a sort of curtain to the frame-work of the nest, which was in most cases completely hidden from view. As the branches aged and decayed, the leaves withered and gradually fell off, exposing the stick-structure of the nests.

"Birds were observed in the act of building and carrying small branches of Pipal with the leaves still on. In all cases the male, presumably, collected the building material and carried it to the female, who either accepted it or rejected it. She would remain perched on the chosen site while he flew off and deliberately broke, at times after considerable labour, a small green Pipal-branch with which he flew to within a few feet of her. -Two, three or more ungainly hops and flaps then brought him to her. She, with neck

outstretched, would take the branch from his beak and, if approved, would forthwith place it in position, he flying off for another, leaving her perched with neck drawn in or gently pecking at the newly-arranged branch.

"If she happened to reject a branch she held it horizontally in her beak and worked her hold along it, as if testing it, by a series of quick, short jerks, ultimately allowing it to fall to the ground. The male, looking foolishly on, would then fly despondently off to make a better selection.

"I have never found the Egret breeding in company with others.

"Parent-birds robbed of their eggs deserted their nests, the sticks of which were in most cases appropriated by others.

"In all cases I observed white birds paired with white and slate with slate, the young in each case resembling their parents.

"The building and rearing season of the birds under observation extended approximately over a period of three months, from March to early June.

"Local fishermen tell me that birds breeding in the Mangrove-swamps do not commence building till May. A reliable man sent to the swamp on the 15th March reported that numbers of birds had been seen but none found building."

Ticehurst says (Ibis, 1923, p. 270) that this Heron in Sind "is resident and breeds in rather scattered colonies in the higher mangroves; the first eggs are laid early in May, but, as many eggs are taken for eating, fresh eggs are found well on in June."

Butler also records eggs taken in May by Mr. Nash from nests in Mangroves growing in a creek 20 to 25 miles from Ormarra on the Mekran coast. These birds were said to be breeding in company with a few Pond-Herons. Butler himself also obtained eggs from nests in the Karachi Harbour, built on Mangrove-trees, on the 8th and 27th May, and here, again, they were breeding with Pond-Herons.

From the above it would seem that the coastal Mangrove-breeding birds lay in May and June, while those nesting inland lay in March.

In Ceylon Layard records their breeding in the Chilaw Lake in May and June while, in the Persian Gulf, Cummings, Cox, Cheesman and others found them breeding on various islands during April and May.

Three or four seems to be the normal clutch and the former number most often. Nash, however, speaks of five being the maximum number and Layard says the eggs number four to six in Ceylon.

In colour, shape and texture the eggs exactly resemble those of the Little Egret.

Fifty eggs average 44.9×34.3 mm.; maxima 49.7×34.0 and 46.0×36.0 mm.; minima 43.8×32.8 and 44.9×32.3 mm.

Except that Eates has not yet determined the duration of incubation, his notes embrace all that is known as to nest-building, courtship etc.

There is one point which must be mentioned, and that is that Mr. Nash ascertained that the embryos in eggs laid by slate-coloured birds were dark-skinned and those laid by white birds were white-skinned. The local men told Nash that incubation only took seven days, but this, of course, is an impossibly short time.

(2229) *Ardeola grayii* (Sykes).

THE INDIAN POND-HERON.

Ardeola grayii, Fauna B. I., Birds, 2nd ed. vol. vi, p. 354.

The Pond-Heron, one of the first birds seen by every visitor to the Indian Empire, is found everywhere in India, Ceylon and Burma, whilst outside our limits it extends North-West into the Persian Gulf, East into Siam and South through the Malay States. It occurs also in the Laccadives, Andamans and Nicobars.

Wherever there is any water, small or large, stagnant or running, village ditches and ponds, great swamps and lakes, or the flooded rice-fields, there will the "Paddy-bird" be found. Wherever found, there he breeds, if there are trees, bushes, bamboos or palms of which he can make use as sites for his nest. Like most Herons, they breed in colonies and they are most sociable birds, preferring to nest in company with other species rather than in isolated colonies of their own, which one seldom meets with.

My own experiences probably cover all that need be said about the breeding of this familiar bird. They breed, as has already been said, in colonies but, as a rule, these are of no great size, nor do they mass their nests very closely together. They prefer either big trees or tall bamboo-clumps to nest in and usually anything from two or three nests to about a dozen may be seen on any one tree or clump of bamboos. Of course, when breeding with other species, they cannot be responsible for insanitary overcrowding by these birds, and I have seen the small untidy nests of the Paddy-bird jostled on all sides by those of Cormorants, Egrets and Herons of various kinds, sometimes actually touching them on either side. Forty or fifty pairs constitute a large colony of Pond-Herons; and I should think that more are under, rather than over, thirty. At the same time they are so common that one may be within "shouting" distance of two or more colonies, and at the same time I have seen four distinct colonies in and on the outskirts of one village, all with some admixture of other breeding birds. The largest colony I have ever seen was in the Sunderbunds, where the birds were breeding on trees, palm-trees and bamboos all round, and in a big fishing village on some high ground surrounded by swamps and rice-fields. Here there must have been thousands of birds breeding of many kinds but the Paddy-birds seemed to outnumber all the rest, having their nests mixed up indiscriminately with the others but, here and

there, on some of the larger trees occupying almost every available site to the exclusion of the other species. It was impossible to estimate the number of pairs breeding as the united colonies occupied a ring of nearly a mile, in addition to the trees and palms inside the village.

I have only seen one breeding-place on reeds or rushes. This was in Assam, where a bed of Elephant-grass and reeds, probably some 10 feet high when standing, had been crushed and broken down in one of the North-East storms. The matted stems lay in one great tangle almost 3 or 4 feet above water-level, through which the new reeds and grass thrust their heads, and so formed an additional protecting screen. On this bed a few Purple Herons, a single pair of Purple Coots and about thirty pairs of Pond-Herons had built their nests.

Oates thinks that at Myitkyo these Herons were also breeding in the reeds but he did not actually see any nests.

The nests themselves are poor things, generally about 8 inches to a foot across and from 3 to 6 inches deep. The upper surface is very flat, the depression for the eggs being seldom more than an inch deep in the centre. At the same time I have found that, when building on the ever-swaying bamboos, the nests of the Pond-Herons and, indeed, those of other birds also, have much deeper receptacles for the eggs, which would otherwise roll out. They are made of bits of dead sticks and also of green twigs torn by the birds from the trees in which they nest.

I cannot say that I have noticed that any trees are specially selected, though probably more are built on Mango-trees round villages than in any others.

In Northern India and Burma most birds breed from early in July to September, but in Assam one sometimes sees colonies laying in late May or June. Butler says that in Deesa they lay from May to September; Davidson records their nesting from May to July in Western Khandesh, while Legge also says they lay in May and June in Ceylon. Hume, however, says that in Southern India, within the range of the North-East monsoon, they lay in December, and the few records I have received give December to March as the breeding months.

The number of eggs laid is three to five, though the last is rare, and Jerdon says that sometimes as many as six are laid.

They are typical little Heron's eggs, smooth surface and fine texture, very broad ovals and in colour a light sea-green, darker than in the eggs of the Cattle-Egret but paler than in the eggs of the Purple Heron. As Hume remarks, taken as a series they are, perhaps, a little darker than the eggs of most small Egrets, but he also adds that they "are slightly elongated ovals, generally perceptibly pointed at one end and not infrequently at both ends." I have seen such eggs but I should term them rare.

One hundred eggs average 38.0×28.5 mm. : maxima 40.3×29.6 and 39.3×31.0 mm. ; minima 34.3×27.1 and 35.1×27.0 mm.

I think these birds pair for life and, probably, many Herons do this, if not all. A pair which built, among others, on some bamboos alongside a tennis-court became very tame within a very short time of the court being built. They would walk about on the court and accept worms and small fish from any Europeans offering them. Other birds, whose nests were not so prominent or close to the court, were tame enough in that they took little notice of any human being, and never accepted food. Each year when breeding commenced these two birds appeared and at once started on their old terms. This occurred three years running and then the female evidently died, the male arrived alone and was as friendly as ever and, shortly after this, he mated, but it was long before he could induce his wife to become as tame as himself.

Both sexes incubate and the male does his full share of the work, but in building he only brings material to his wife, who makes such use of it as she may think fit.

(2230) *Ardeola bacchus* (Bonaparte).

THE CHINESE POND-HERON.

Ardeola bacchus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 355.

The Chinese Pond-Heron is not uncommonly found in extreme Eastern Assam, though I never saw it in the Surrma Valley. It does, however, occur in Manipur, whence it extends East through the whole of Burma and the Indo-Chinese countries to China and Japan, and South through the Malay Peninsula and Archipelago to Borneo. It is also found in the Andamans.

In Lakhimpur there were a good many small colonies of this Pond-Heron breeding in both the North and South districts of the Eastern Brahmapootra valley. In the mixed colony of birds breeding near the Tinsukia railway station there were five pairs of birds, four breeding in among the *Ardeola grayii* on the clumps of bamboos and one certainly breeding in some Mango-trees nearby, though we never actually fixed the nest. The foliage was dense and, though we were practically certain it was one of a small clump of five nests hidden in the foliage, we could never determine which.

Three other pairs bred with some Indian Pond-Herons at Dimaji close to an enormous colony of Open-Bills, who all nested separately on some palms. I saw none of these birds in the great colonies of Herons, Egrets, Cormorants etc. in Western Assam, and I think Tezpur is about their extreme Western limit.

Vaughan and Jones found them very common in China and breeding in great numbers in May, and describe them as nesting in large mixed colonies just as the Indian bird does.

The few notes I have received from Burma also show that there is little or no difference between the two Pond-Herons in their breeding-habits, though I have no account of any really large colonies.

The breeding season, as noted above, seems to be principally in May in China, but in Burma and Assam, though a few birds lay in that month, the greater number lay from the middle of June to the end of July and early August, while a few eggs may still be found in September.

They lay from three to five eggs, generally four, which are exactly like those of the preceding bird.

Fifty eggs average 37.7×28.4 mm.: maxima 39.2×28.8 and 38.2×31.0 mm.; minima 34.0×26.7 mm.

***Butorides striatus* (Linn.).**

THE LITTLE GREEN HERON.

(2231) *Butorides striatus javanicus* (Horsf.).

THE INDIAN LITTLE GREEN HERON.

Butorides striatus javanicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 357.

The Green Herons, or Green Bitterns as Hume called them, are found almost all over India and Burma, in Ceylon, East through the Indo-Chinese countries, to China and South through the Malay States to Java, Borneo, Sumatra and other islands. There is also a single skin from the Laccadives, but it is very dark and should, perhaps, more properly be placed with the Mauritius race *rutenbergi* of Hautlaub.

This is a very solitary little bird, breeding on water-ways of all kinds but not, as a rule, in swamps and lakes. Normally it breeds on the banks of streams, canals and, in Bengal and Bihar, on the numerous small water-ways and creeks which are dry, or nearly so, in the dry season and full, nearly to the brim, during the height of the rains. They were very common birds in Assam, where almost invariably I found them nesting in densely foliated bushes overhanging streams. Many birds nested on these streams up to an elevation of 2,000 feet, and one nest was taken by me on the Laisung stream at 3,500 feet, the bird being shot as she flapped off the nest.

Occasionally I have taken nests from the edges of swamps, lakes or banks but, even then, most of the nests I have personally seen were built in bushes or scrub overhanging a fairly deep piece of water and not in reeds in mud or low water. Sometimes, however, they are so found. Hume himself found a nest "in a clump of reed and rush outside the Western Jumna Canal," while Doig wrote to Hume from Sind: "In one clump of young Babool trees about 300 yards square I found fifteen nests." Marshall also took

a nest at the edge of a jheel in the Multra district which was in an unusual site, in a keekur-tree 20 feet from the ground.

Doig's colony of fifteen nests is the only one I have ever heard of, nor does the bird often breed in the mixed colonies of other Herons. Once I found a nest on the edge of a tank well hidden in a dense bush under some trees inhabited by a colony of Pond-Herons and other birds and once I found a nest in a bush beside a stream running into a swamp at a point where about 200 or more pairs of various birds were breeding on the partly submerged trees. When I found them nesting on the streams, each pair of birds had their separate stretch of water, and I do not remember ever finding two nests within a couple of hundred yards of one another. The birds are quite as secretive about their nests as they are in their personal habits. The nests themselves are much the same as those of the Pond-Herons, platforms of sticks and twigs, but with a rather deep depression for the eggs and with no true lining. Instead of being conspicuous nests they are nearly always well concealed, and I have known a bird fly from a hush, revealing where it was to be found, yet it has taken some amount of peering and poking around to disclose it. Of course it is easily enough seen when built in a sparsely foliated tree such as that described by Marshall, or on Mangrove-trees on the Sind shores, where Ticehurst says it breeds, but these situations can hardly be considered typical.

An interesting note on this bird's secretive nesting habits is given by Law (*Journ. Bomb. Nat. Hist. Soc.* vol. xxx, p. 918, 1925): "Making its abode in the heart of a village, it so adjusts itself to its environment and regulates its activities as to escape detection altogether. I found the birds began nesting in March and in April I found the young ones sufficiently grown up and fully feathered." Law found several nests well hidden in Mango-trees, though at some height from the ground.

Ticehurst says they breed in the Mangroves in May and I have eggs from Barnes taken in Sind on the 28th April, but the normal season is from the end of June to September or, in the wetter climate of Assam, May to August. In Bihar Inglis also found that they sometimes bred in May but he, too, says that the rainy season is the one in which most birds lay. In the Konkan Vidal found them breeding in March and April. It is possible that they sometimes breed twice and Law thinks that the birds he found breeding in Bengal in March and April bred again in June and July. They are said to lay from three to five eggs and undoubtedly over a great part of their breeding area numerous fours and a few fives have been taken but, in Assam, at all events, Coltart and I have found three only to form the usual clutch while, in Bihar and Bengal, Inglis reports the same.

Except that they are proportionally often rather longer in shape and slightly larger in size than the eggs of the Pond-Heron, it is impossible to describe any difference between the two. They may

be slightly duller and deeper in tint, but any individual egg of the one could certainly be matched by an individual egg of the other. The inner membranes in both species are bright sap-green in fresh eggs, dull sap-green in those much incubated.

Forty eggs average 39.5×29.7 mm. : maxima 42.8×32.0 mm. ; minima 33.0×26.3 mm.

Both sexes incubate but, beyond this, I know nothing about the incubation. I have watched the birds in the breeding season for long periods frequently, yet I have never seen any courtship display by either sex.

(2232) *Butorides striatus spodiogaster* Sharpe.

THE ANDAMAN LITTLE GREEN HERON.

Butorides striatus spodiogaster, Fauna B. I., Birds, 2nd ed. vol. vi, p. 359.

This race of Green Heron is found only in the Andamans and Nicobars.

I can find no record of their breeding anywhere, but Wickham, Osmaston and Anderson all found them breeding in the Mangrove-trees growing on the banks of creeks running down to the shore.

Two clutches, each of three eggs, taken by Anderson on the 18th May, are, of course, just like those of the common Indian bird. These six and six others average 38.2×28.2 mm. : maxima 40.6×28.7 and 40.1×29.9 mm. ; minima 36.1×27.4 and 36.6×26.3 mm.

Nycticorax nycticorax.

THE NIGHT-HERON.

(2233) *Nycticorax nycticorax nycticorax* (Linn.).

THE NIGHT-HERON.

Nycticorax nycticorax nycticorax, Fauna B. I., Birds, 2nd ed. vol. vi, p. 359.

The Night-Heron is distributed over a great part of Southern and South-Central Europe, Northern Africa and the greater part of Southern and Central West Asia and farther East to China and Japan.

Over much of its habitat it is a very common bird, and within our limits it is found almost wherever there is ample water in the shape of lakes, swamps and other similar pieces of water, often where these are nothing more than small villages ponds. In the hills in the West of India it is quite common in some places, as in the Kashmir Valley, up to 6,000 feet or more. These Herons have the usual habits of their tribe, building nearly always in colonies on trees etc. near water. Occasionally, though it must be very rarely, a single pair of birds may be found breeding by themselves.

Hume says that the only three nests he has seen were single ones ; on the other hand I, who must have seen some thousands, have never seen one built in a situation by itself. The Night-Heron often breeds in company with other Water-birds but nearly always in positions isolated more or less from the rest of them. At other times it nests apart altogether.

On the Vedan Thaugal Lake Bates found them nesting in among the other Herons and not in a group by themselves ; in Kashmir Brooks found them breeding together with the Grey Heron and near Allahabad with "*Ardea alba*." Doig also found them breeding in Sind in the society of Herons, Cormorants and other birds in the Eastern Narra swamps, but here they were all together in groups separated from the other birds.

Personally I think I have seen more colonies quite by themselves, and even when mixed up with other Herons etc. the Night-Herons have usually been more or less grouped by themselves. In the great swamp in Barpeta the Night-Herons were sometimes nesting in groups by themselves, while at other times several nests were intermingled with those of other birds and, more rarely, a single nest of this Heron might be found among a group of nests of some other species.

They undoubtedly usually breed on trees of some size and height, or on bamboos and palms, and they seem especially partial to palms and Tamarinds, though I have found them also on Banyans, Peepul, Jack-fruit and many other kinds of trees. They do not always breed in trees, however, for Doig says of the Eastern Narra colonies, "in one part of" (the swamp) "a few clumps of tall bul-rushes were growing, and in these and the adjoining trees the nests were built." Brooks also says that in Kashmir they sometimes nest in the reeds.

The site chosen for the nesting is not necessarily in or near water and I have seen colonies at a considerable distance therefrom ; one in a garden in the Santhal Parganas, consisting of about forty pairs, was half a mile from the nearest swamp or rice-fields. This colony had all their nests in one tree, a Jack-fruit, and during the day, while one bird of a pair was on the nest the other sat huddled up close to it. The nests were scattered about at all elevations in the tree from about 15 feet nearly to the summit. This is the normal thing with these Herons, who do not keep to the extreme tops of the trees, as some others do, for huilding purposes. This colony may be considered a fairly large one ; sometimes the birds collect in small numbers, fifteen to twenty-five pairs or so, but more often, I think, from thirty to fifty, while anything over the latter would be exceptional.

The nests are much like those of others of the family, possibly rather more flimsy than most, while they measure anything between 8 and 10 inches in diameter and from 1 to 4 in depth. Brooks says they "are composed entirely of sticks and twigs in the form of a simple

platform, frequently so scanty that the eggs could be seen through the nest from below." I do not think I have seen any quite so badly put together as to show the eggs through but they have often struck me as being so badly built that they looked unsafe. There is no lining to them of any kind and the sticks used for the body of the nest may be dead bits or twigs torn from the living tree, seldom, however, with any leaves on them.

In Kashmir the Night-Heron breeds in April and May, but everywhere else in India, and also in Burma, the great majority of birds breed in July and August, while in Ceylon Wait says ('Birds of Ceylon,' 2nd ed. p. 428) that the breeding season varies according to conditions of weather and water-supply, and that he has "taken eggs in March, July, September and December."

The normal full complement of eggs is four, but both threes and fives are not uncommon, while occasional clutches of six may be taken. They are quite ordinary eggs of the Heron's-egg type, pale blue-green of normal texture, but rather long ovals in shape.

Fifty eggs average 49.9×35.1 mm. : maxima 54.1×35.8 and 51.3×37.3 mm. ; minima 46.1×35.9 and 47.2×32.2 mm.

Both birds incubate and both assist in making the nest, but the male generally, though not always, merely brings materials for the female to use. In the Santhal colony, which was within a stone's throw of my bungalow and, therefore, very easy to watch, I noticed a rather curious custom of the birds. Many species we know leave their eggs in the middle of the day, when the heat is more than sufficient to relieve them from the work of incubation. These Herons, however, left their nests in the late evenings and early mornings. As everyone knows, they are nocturnal in their habits, and each evening, just before dark, and for about an hour after, the birds, one by one, flopped away from their nests or their perches near them to their distant feeding-grounds. They took a long time to disperse and for at least an hour one could hear their loud occasional squawks as they winged their way overhead. Some time during the night many returned, perhaps one of each pair, while just before daylight I could hear them once more leaving the Jack-fruit tree for another spell of feeding.

Gorsakius melanolophus.

THE MALAY BITTERN.

(2234) *Gorsakius melanolophus melanolophus* Raffles.

THE MALAY BITTERN.

Gorsakius melanolophus melanolophus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 361.

This handsome Bittern is resident and breeds on the Malabar coast and in the Southern Bombay Presidency. Like so many

other species, it is then found in Assam, Manipur and all through Burma in the wetter tracts, the Malay Peninsula, Sumatra, Java, Borneo and Formosa.

Davidson discovered this Bittern breeding in Kanara, and thus describes its nesting there (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 70, 1898):—"This bird . . . is the shyest bird I know, keeping to small nullahs and streams surrounded by evergreen woods. I have seen its nest several times. In all cases it was placed in a small tree overhanging a nullah (then, *i. e.*, the rains) full of water. It is a small structure much like that of *Ardeola grayi* and generally built of light-coloured sticks. It is not concealed at all, and generally from 15 to 20 feet from the ground. When breeding, the birds are bold and come freely to the nest."

The first nest ever taken was probably one found by myself in North Cachar but, though I shot a Malay Bittern *near* the nest, the eggs looked so unlike Bitterns' eggs that for some years I feared to accept their identity as proved. Later I obtained several nests and then found that my first nest was authentic.

This nest was like a small nest of *Ardea cinerea*, built of sticks, twigs and bits of coarse reed with a *good lining* of coarse reeds and rushes and was placed 30 feet up in a big tree in virgin forest on the banks of the Bandho stream. Except for the lining, the nest and the site it occupied were quite typical of the bird, both in North Cachar and in Lakhimpur, where Coltart and I took several nests. The bird we never found outside deep forest but, in most cases, the nests were built on big or small trees beside hill-streams, small pools or swamps closely surrounded by virgin forest. In Lakhimpur Coltart found two clutches of eggs, which he gave me, in nests at the edge of a small swamp surrounded by the thickest of evergreen forest. One of these was taken from a nest built about 40 feet from the ground, the other from a nest built of thick reed-stems and stout bulrushes, placed on an enormous pile of broken-down reeds and Elephant-grass, about 6 feet above the water. This latter situation is one I have never seen used by these Herons, nor did Coltart ever find another like it.

Those I have found have been placed in trees at all heights from about 15 to 40 feet from the ground, most often, perhaps, at about 25 feet.

T. R. Bell took many nests in Kanara and remarks (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 394, 1902) of their nests:—"It is hard work at the best of times seeking for them, as the birds build during the heaviest rains, always in very retired places in thick jungle, generally choosing some steep nulla. The nest is always placed in a conspicuous position, at least it is conspicuous when once discovered, but it is easy to overlook and generally in a terminal fork of a branch of a thinnish tree, anywhere from 15' to 30' from the ground. I have always found the tops of the hills the surest place for a find and, generally, at the commencement of a nulla.

The number of eggs laid is three, often four, rarely five. The birds are very regular in their time of laying, which is always the end of July or commencement of August."

There is little more that one can add to this. Stewart obtained many nests in Travancore and his notes agree with Bell's, but he found the time of breeding to be the end of May to early July. The nests Coltart and I found were all in May and June except one I got in North Cachar in July.

The number of eggs in a full complement is, as stated by Bell, three to five.

They are quite white but, when freshly blown, the green inner membrane shows faintly through, though in old eggs this becomes yellowish and does not show at all. The texture is fine and close but the shell rather fragile for their size and sometimes the surface is very faintly glossed. In shape they are broad ovals, occasionally slightly pointed at one end, but generally very obtuse.

Forty eggs average 46.2×37.2 mm.; maxima 49.1×38.3 and 48.0×40.0 mm.; minima 44.0×37.2 and 46.4×36.0 mm.

The female is a very close sitter, hissing and croaking at the intruder, and refusing to move until almost touched.

A hen-bird, sitting on four eggs on the point of hatching, retired to the edge of the nest and, facing sideways to me, raised the wing on the far side and depressed the one next me, forming, as it were, a fan held sideways. This appears to be the same as the male's display in courtship, as on one occasion I saw him crouch on a bough close to the female and then elevate his tail until his back was at right angles to the bough, all this being in very slow time, when, suddenly, both wings, widely spread, were elevated over his back. At the moment, unfortunately, I made a noise in the undergrowth, the show collapsed and the male and female both flew off. Prior to the display the male uttered croaks very similar to that made by the female on the nest.

Ixobrychus minutus.

THE LITTLE BITTERN.

(2236) *Ixobrychus minutus minutus* (Linn.).

THE LITTLE BITTERN.

Ixobrychus minuta minuta, Fauna B. I., Birds, 2nd ed. vol. vi, p. 364.

The Little Bittern breeds in Europe, Northern Africa and Central Asia as far as India. In the last-mentioned country it breeds in the Himalayas between 4,000 and 8,000 feet, sometimes higher and sometimes lower when there are suitable reedy lakes and marshes. It also breeds in Sind and I once found a nest in Cachar, but I do not

believe for a moment that it normally breeds in the plains except, perhaps, in Sind. More than once I have had reports sent me that it breeds in the Sunderbunds but, on investigation, sufficient proof was never forthcoming. Of course, occasional wounded birds may stay and breed in the plains and the Cachar birds may have been such.

They are extremely common in Kashmir and everyone who has visited the various lakes has found their nests in numbers. Davidson (Ibis, 1898, p. 41) says that it is "very common on the Dhal Lake and in the marshes round Gandarbal at the end of June. It was then breeding, and in a couple of mornings we found some twenty nests. They were in patches of rushes and other weeds and were very slight structures; the greatest number of eggs in any nest was six. The female is very tame, and several times allowed herself to be caught on the nest."

The following notes summarize those supplied to me by Ward, Osmaston, Davidson and many others. The bird is just as common in the other lakes in Kashmir between 5,000 and 7,000 feet as it is in the Dhal Lake, and nests may be found in great numbers between the end of May and the end of July, the great majority being laid in the latter half of June. The site preferred for the building of the nest is some dense bed of reeds standing in a few inches of water. Here the nest may be placed between the stalks of the reeds low down within a few inches of the water or as much as a couple of feet above it while, in exceptional cases, it might be over 3 feet. Sometimes the nest is built on a platform of broken-down bits of reeds etc. but, more often, portions of the surrounding reeds are brought down to support the structure and more or less mixed up with the material of which it is composed. Sometimes it is situated in quite open beds of reeds where some little clump thicker than the rest affords it sufficient support though little concealment. Ward sent me a clutch of eggs taken from a nest built in among the weeds on one of the floating weed-islands so common in the Kashmir lakes, and informs me that this is not a very uncommon site.

Occasionally it builds its nest in luxuriant grass, hidden well away among the roots; one has been taken in a bed of nettles in pasture-land and one or two others have been found under bushes at the edges of lakes. Hume also notes that it is said often to breed in among wild rice.

The nest is a rather flimsy, poorly-pnt-together cradle of rushes, blades of reeds and bits of stems. It may measure anything from 6 to 10 inches across, with a cup from 1 to 2 inches deep for the eggs. The fabric itself is thin and seldom measures more, and very often less, than a couple of inches in depth. The materials are not woven in any way, merely being placed round and round and criss-crossed, sometimes with the surrounding and supporting reeds.

A curious position for the nest is recorded by Whitehead, who found one, "a flat pad of reeds on a stump 3 feet above the water, at Dandar, on the North-West Frontier."

The breeding season is principally June, but occasional full clutches of eggs may be taken in the latter half of May, while a few others may be taken to nearly the end of July.

The eggs number four to seven but I think six eggs are usually found in full sets. They are white, or white with a faint bluish tinge, so faint that it is difficult to detect. In shape they are very regular ovals, scarcely smaller at one end than the other, while a few are longer ovals and still fewer are distinctly pointed at the small end. The texture is fine but not very close, the surface smooth but glossless and easily stained, while for their size they are distinctly fragile.

Eighty eggs average 34.1×26.0 mm.: maxima 36.8×25.4 and 36.4×27.3 mm.; minima 30.1×25.1 mm.

Both sexes incubate and build the nest, and incubation is said by Hooke (Witherby, Handb. of B. B.) to take some days less than the usual sixteen to seventeen credited. They do not lay twice unless their nests are raided early in the season.

As recorded by Davidson, the birds are very close sitters and the hen often allows herself to be captured by hand rather than abandon her eggs.

Ixobrychus sinensis.

THE YELLOW BITTERN.

(2237) *Ixobrychus sinensis sinensis* (Gmelin).

THE YELLOW BITTERN.

Ixobrychus sinensis sinensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 365.

The distribution of this little Bittern is rather curious and follows that of many species and genera of other families. It occurs in Ceylon, is common and resident in Travancore and Malabar, less common but occasionally breeds in South and Central India. In the North it breeds commonly in Sind and again in Eastern Bengal and Assam. It occurs and breeds numerous in Burma, extending South and East to South China, the Malay Peninsula and Archipelago to the Celebes.

It haunts swamps, lakes and occasionally village ponds and smaller pieces of water, but it is not found in these nearly so often as the Cinnamon-Bittern is, though it is such an adept at concealment that it is quite possible for a pair to frequent a reedy pond without being detected. It breeds in much the same places as the Little Bittern does, though some rather curious sites have been recorded.

Oates remarks that in Pegu, "common as this bird is, its nest is one of the most difficult to find and, when found, to secure. It selects the matted leaves of immense reeds, and places its nest on the summit where wind and rain have entangled the leaves and worked them into a platform. The nest itself is a mere pad of dry grass and leaves."

Valentine Irwin, in Commillah, notes that in a clump of rushes "doubled into the smallest imaginable space, was a Yellow Bittern, on a little rush-and-reed nest built on the top of a small mud pillar, which projected about 6 inches above the water-level, and which was entirely surrounded by a dense growth of that round sedge Snipe so affect in the cold weather. She did not fly off until I put out my hand to seize her."

I have personally seen some dozens of nests of the Yellow Bittern, which is extremely common in swamps in all parts of Assam. It builds its nest most often in reeds, rushes, or Elephant-grass round the edges of the swamps and lakes but seems to place them indifferently at all heights above the water from an inch or two to three feet or more, though I have never seen the nests on the summits of the reeds as recorded by Oates. I think most often the nest is quite low down, as low in fact as the tangled mass of broken debris will allow it to be placed, which may be a couple of inches above the water, or it may be so matted as to fill all the interspaces between the reed-stems to a considerable height. Sometimes it is placed between a few reeds close together with no more foundation than a few bent-down stems and blades. I have also found nests built in caue-brakes in swampy ground, once as much as 4 feet above the mud; at other times I have found it tucked away in the roots of thick pasture-grass or weeds, while I also once found a nest on a bank between two rice-fields, where a large stretch of rice-cultivation gradually merged into a deep and weedy marsh.

In Sind Scrope Doig found them breeding in very similar places; he notes:—"The nest is sometimes situated in the centre of a tussock of grass, or in a bunch of reeds growing in the centre of a tamarisk-hush in the water, and two nests I found in the middle of some rushes; the tops of the rushes had been bent down and were tied together, forming a little platform, about three feet above the water."

The nests, which are always made of leaves, stems and bits of rushes and reeds, with no special lining, average about 7 inches in diameter. Those built without some foundation to lie on may be 2 inches or more in depth, but those built on a foundation of fallen reeds etc. are often very fragile and, perhaps, not half an inch thick. The depression for the eggs is invariably very shallow.

The birds commence to breed as soon as the rains have well set in and the swamps fairly filled. A few eggs are laid in June but most not until July, while a few fresh eggs have been taken in September.

In Sind Doig found nests with eggs in May and August.

The number of eggs laid is four to six, the former far more often than is the case with the Little Bittern, the latter rarely, while Butler records taking three eggs near Deesa which were on the point of hatching.

The texture is fine, not very close, and the shells are glossless and fragile.

In colour they are pale skim-milk blue or green-blue and, although the tinge is but slight, fresh eggs show quite distinctly blue when placed with really white eggs. The inner membrane is the same or a shade darker blue, whereas that of the egg of *minutus* is white or pale yellowish-white.

Sixty eggs average 31.2×23.9 mm. : maxima 33.7×25.0 and 31.2×25.5 mm. ; minima 27.5×22.2 mm.

(2238) *Ixobrychus cinnamomeus* Gmelin.

THE CHESTNUT BITTERN.

Ixobrychus cinnamomeus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 367.

The breeding range of this Bittern is almost exactly the same as that of the Yellow Bittern, though its numerical distribution varies. It occurs in Ceylon, Travancore and the South-West coast of India but is not common there. In Western India from Cutch northwards and over practically the whole of Northern India it breeds more or less commonly wherever there is suitable breeding ground. In Eastern Bengal and Assam it is a very common resident and breeds in greater numbers than the Yellow Bittern, while in Burma it breeds freely from the North to the extreme South.

Concerning its nidification there is not much that one can say except that it is similar to that of the Yellow Bittern but that the nest is bigger and, perhaps, rather more bulky in proportion. The diameter is between 8 and $8\frac{1}{2}$ inches and the depth sometimes as much as 3.

The sites selected for the nest include all those mentioned for the preceding bird except, so far as I know, the elevated position recorded by Oates on the summits of giant Elephant-grass.

The birds are even bolder than *I. s. sinensis* and I have often found nests in among the weeds, grass and bushes round the edge of village ponds, generally in the water but, sometimes, on the bank close to it. Round Calcutta it was common in the swamps and in most village ponds and both Hume, Parker and I myself have taken or seen nests with eggs in the Botanical Gardens, while I also found one in a tiny pool in Nadia town which had reedy fringes on one side of it just dense enough to fully conceal the nest and sitting bird.

Like all its nearest relations, the favourite site is a tangle of reed at the edge of big swamps, and such nests are recorded by Brooks

from Etawah; Scrope Doig and Butler in Sind; Oates, Osmaston, Cook, Mackenzie, Hopwood and others in Burma; Coltart, Inglis and others in Assam; and by yet other collectors from various parts of India.

The only unusual site recorded is by Col. Butler from Belgaum, who says: "The nest, which consisted of a tolerably substantial pad of short pieces of coarse, damp sedge, lined with pieces of dry grass, was built upon a small plot of rising ground in the middle of an inundated cornfield. The island was covered with grass, two or three feet high, and weeds, and the nest was built in the grass about a foot from the ground, and some 9 or 10 feet from the water's edge."

Everywhere, so far as has been recorded, the birds breed in July and August, in most places, also, some eggs being found in June and September. In Tippera Valentine Irwin found a nest on the 30th May which contained four fresh eggs and in the Andamans Osmaston also found one with a similar clutch on the 2nd June. These are the earliest clutches I am aware of.

The full clutch is four to six but the latter is exceptional and, personally, I have never taken more than five, while Shopland and Butler both took clutches of three eggs which were incubated.

The eggs are white, dull and opaque but Hume says that occasionally they have a blue tint. This I have never seen. The inner membrane is faintly yellowish. The texture is closer and broader and the shell stouter than they are in the eggs of the Little or Yellow Bittern and in most cases this alone would suffice to distinguish them.

In shape they vary from short to long ovals, generally almost cylindrical.

Dupetor flavicollis.

THE BLACK BITTERN.

(2239) *Dupetor flavicollis flavicollis* (Lath.).

THE BLACK BITTERN.

Dupetor flavicollis flavicollis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 368.

I have nothing to add to the distribution given in the 'Fauna':-- "Practically all India, but only thinly scattered here and there over the greater part. It is not rare in Ceylon and is comparatively common in Malabar and Travancore. In Eastern Bengal also it is common and in Assam very common, and thence it ranges through Burma to China, the Malay States and the islands to the Philippines and Celebes." In Sind Scrope Doig found them "numerous in several places" and in the Shan States it is very

common in the breeding season between 3,000 and 4,000 feet, but leaves for the cold weather.

This Bittern in India is almost entirely a bird of the plains but in North Cachar I found it breeding up to 2,000 feet and in the Burmese hills it breeds much higher, wherever there is suitable ground.

It haunts much the same kind of country as the three smaller Bitterns of the genus *Ixobrychus*, but by no means confines its nesting-sites to reeds, rushes or Elephant-grass, though, perhaps, two out of every three nests may be so situated. I have found them in cane-brakes 3 or 4 feet from the surface of the mud or water and, occasionally, as much as 6 feet. They may often, also, be found on bushes, especially thorny ones well raised above the water. I have twice found the nests in bamboo-clumps, once 5 feet and once 10 feet from the ground, while Oates also records their breeding both on bamboo-clumps and on thorny bushes in a paddy-field. When placed on bamboos they are not built over water and very often when on bushes and, occasionally, when on cane-brakes they have dry—more or less—ground under them.

Scope Doig gives a good description of the nest, which agrees well with the many I have seen:—"The nests are formed of tamarisk-twigs, with sometimes a few aquatic weeds on which the eggs are laid; they are generally placed about 5 feet over the water, either in a dense tamarisk-bush or thick clump of weeds, and are about 9 inches in diameter, 3 inches thick, and have a very slight depression in which the eggs, always four in number, are laid."

The distinctive features are here all referred to: first, the greater height above the water and, secondly, the use of weeds as a lining for the nest. When built on reeds the nests are generally made entirely of reed-stems, reed- and rush-blades and have no special lining beyond the softer blades of the same materials in strips. When, however, built on bamboos or bushes they often have a lining of water-weeds, more especially if built over, or at the edge of, water, or of land-weeds and grass when built in bushes and bamboo-clumps on dry land.

As a rule it is a solitary nester and I have found no nests except of this description. Livesey, however, tells me that in the Shan States he has found them "breeding, several pairs together," in among a colony of Egrets, making their nests on rushes or hushes in the Inlé Lake in the Shan Hills.

In Sind presumably they breed in May and in China both La Touche and Jones found eggs in June, but everywhere else they breed from July to September and I have once taken fresh eggs in the first week of October.

Four eggs form the usual full complement but Jones obtained clutches both of three and five near Hong-kong, which were incubated.

In colour they are the palest blue or sea-green imaginable and, looking casually at a series, one would call them white.

In shape they are almost invariably broad ovals, the texture similar to that of the egg of *Ixobrychus*.

Forty eggs average 41.6×31.4 mm.; maxima 45.0×33.5 mm.; minima 38.8×30.8 and 42.1×30.5 mm.

Both sexes incubate and both assist in building the nest, the male, at all events sometimes, working on the construction as well as on the gathering of material.

They sit very closely and I have watched birds on these nests within a foot or two for some minutes without their moving.

The young birds when disturbed sneak away in among the reeds or other cover, creeping back again as soon as they think danger is over. If caught suddenly and they have no time to hide they either crouch quite flat or assume the usual Bittern protective attitude, standing absolutely erect, with neck and bill outstretched and pointed straight upwards, so that it is really very hard to distinguish them from the straight reeds all round them.

Order XIII. PHENICOPTERI.

(FLAMINGOS, DUCKS and TEAL.)

Family PHENICOPTERIDÆ.

(FLAMINGOS).

Phenicopterus ruber Linn.

THE FLAMINGO.

(2241) *Phenicopterus ruber antiquorum* Temm.

THE FLAMINGO.

Phenicopterus ruber antiquorum, Fauna B. L. Birds, 2nd ed. vol. vi, p. 373.

The only known breeding place of the Flamingo in India is one discovered by the Rao of Cutch eight miles North-East of the Paohham in the Rann.

The discovery is recorded by Captain Lester (Journ. Bomb. Nat. Hist. Soc. vol. xi, p. 563, 1898). In a letter written by His Highness to Captain Lester he says:—"I have caused a letter to be sent to Khadir to enquire the name of the spot where the Flamingo's eggs were found and shall let you know when the answer is received. In the meantime I have looked up the letter which was received

with the eggs sent last year by the official at Khadir. This letter is dated 23rd October, and I received with it about 20 eggs and two recently-hatched fledglings. The eggs were easy to blow as the young ones were not formed inside. From this it seems safe to consider that the flamingos lay in September and October. The letter further says that the men who picked up the eggs found numerous nests in one place on the Rann.

Further enquiries elicited the fact that the place where they were found was as given above and a description of the nests, said to have been constructed in shallow salt lagoons, shows them to have been of the ordinary cone-shaped heaps of mud always made by these birds. It also appeared that the eggs, or some of them, had been collected in late August.

It has also long been believed that the Flamingo bred in Ceylon but, very recently, Wait has been able to show that, though the birds are found in Ceylon, they do not breed there. In a letter to me he writes:—"We went up to Kokhalai lagoon, north of Iruico, in August and saw hundreds of flamingos, but their movements beat me. We had a boat on the lagoon and explored it pretty thoroughly but could find no signs of breeding grounds. All the birds we saw were adults and there were no birds in juvenile plumage. There was quite an intelligent old villager who had fished the lagoon for over 30 years, and both he and the rest of the villagers were emphatic that the flamingos came in April, left in September and never bred. Can they be second-year bachelors, who keep to their own movements while the older birds breed North?"

Outside India they breed in South Europe, the greater part of Africa and Asia as far East as Lake Baikal and the Himalayas. In these countries and in the Persian Gulf, where great numbers breed, the laying season is April and May.

Two eggs form the usual clutch but sometimes one only is laid.

The eggs are very like huge eggs of Cormorants and Shags, the real shell being pale blue, from the colour of skim-milk to a rather deeper shade, the whole of this being covered with a deposit of calcium. This is evenly deposited over the whole egg and it is very rare that the blue shell underneath the calcium shows through. The inner shell has the texture quite fine and close with a smooth hard shell, though, again, like the Cormorant's eggs, brittle for its size.

Jourdain gives the following measurements for the eggs:—Average of one hundred eggs 88.8×54.5 mm.; maxima 103.5×56.5 and 93.7×61.0 mm.; minima 77.0×48.4 and 94.5×47.7 mm.

The eggs I have measured, which were taken in the Persian Gulf etc., all came within these figures.

Order XIV. ANSERES.

Family ANATIDÆ.

(DUCKS, TEAL etc.)

Subfamily PLECTROPTERINÆ.

(WOOD-DUCKS, COMB-DUCKS etc.)

(2247) *Sarkidiornis melanotus* (Pennant).

THE NAKHTA OR COMB-DUCK.

Sarkidiornis melanotus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 386.

The Comb-Duck occurs in Ceylon and breeds there, though it is nowhere common. It is also found over the greater part of India but is rather locally and unevenly distributed. In Sind, though it is a rare straggler, it does not breed; in the Cis-Sutlej, though still rare, it is resident and occasionally breeds. In Eastern Bengal it again becomes scarce but has occurred in the districts of Khulna and Jessore in the Sunderbunds. In Assam it has been reported from Cachar, Sylhet and the Looshai Hills. In Burma it is rare in the extreme North but becomes plentiful in Pegu; while Hopwood says it is common as far North as Pakokku in Arakan.

Outside India it is found in many parts of Africa and Madagascar.

It is a frequenter of pieces of water, large and small, in the plains, but also occurs rarely up to 2,000 feet in the Assam hills and rather higher than this in Burma, provided always that there is a suitable lake or large tank, open country and trees to breed in. Hume gives a very good description of its haunts:—"It much prefers well-wooded tracts, not dense forest like the White-winged Wood-Duck, but well-wooded, level, well-cultivated country. It is a lake bird, too, one that chiefly affects rush- and reed-margined broads, not bare-edged pieces of water like the Sambhur Lake, and is comparatively rarely met with on our larger rivers. I have shot them alike on the Ganges and the Jumna in the cold season, but it is far more common to find them in jhils and bhils. *I have never found it on hilly ground*" (the italics are mine), "and very rarely in small ponds. Just when the rain sets in they seem to be on the wing at all hours of the day." An exception to Hume's "hilly ground" is North Cachar, where they do occasionally appear in the hills and where I have once taken the nest. This was in an unusual position, the eggs being laid in a quite well-made nest of sticks with a rough lining of grass, which was built in a hollow

where the first large boughs of a big tree bifurcated from the trunk. It was not 10 feet from the ground, but the boughs were so massive and so well enclosed the nest that I visited the pool by which it stood, rested under the tree and saw the parent bird several times before I noticed the nest. In this case the tree was one of many standing in heavy grass-land, then all burnt away, beside a pool the whole of the centre of which had reeds nearly 15 feet high with a margin of clear water some 5 to 10 feet all round. I had on three previous days started the tracks of a huge bull buffalo from this pool but had never worked up to him; the fourth day I did get him, and the shot which killed him started the duck off the nest and led to its discovery.

The nests normally are almost invariably placed in large natural hollows in big trees and, also as a rule, in those standing in or close to water but, sometimes, at a considerable distance therefrom. Hume says that most of the nests he has found in the North-West Province were "in some mango-grove, bordering a jhil or broad, the nest, which is composed of sticks, a few dead leaves, grass and feathers, at no great height from the ground, either in some large hole in the trunk, or in the depression between three or four great arms where the main stem (as it so often does in mango-trees) divides at a height of from six to ten feet."

"Once, and once only, I found a nest in a regular swamp at one end of a jhil in amongst a thick growth of sedges and rush, and in this case no sticks had been used, but the whole nest, which was a foot in diameter and 5 or 6 inches in depth, was composed of reeds and rushes, lined with a little dried grass and a few feathers; this nest had a good deep cavity, I daresay fully 4 inches in depth, while those found in trees had central depressions barely half this depth."

Anderson records their breeding in holes of old ruined forts and also found eggs, believed to be those of the Comb-Duck in an old nest of *Haliaeetus leucoryphus*. There are several other records of eggs being found in old nests of Vultures, while Marshall found a single egg of this duck in a nest of *Dissoura episcopa*.

A still more curious site for a nest is recorded by Aitken (Journ. Bomb. Nat. Hist. Soc. vol. xi, p. 552, 1898):—"On the 30th August I shot a Comb-Duck which was handed over to the cook, who found an egg in her. Next day I took two men with me, and began to search for a nest. There were scarcely any trees in the neighbourhood, but many patches of rank rushes, and among them I hunted long without success. At last one of my men, who was the other side of the stream, signalled to me and pointed to a hole in the bank, which at that part was quite perpendicular. I crossed and, looking into the hole, found sixteen eggs which exactly matched the one taken from the body of the bird. They were lying on a bed of twigs and large quill-feathers of some big bird, with a little lining of down and some fragments of snake-skin. The hole was about 5 feet from the

ground, the entrance being about 9 inches wide by about 6 inches deep. The hole went into the bank quite horizontally, and there was nothing in the way of a ledge to alight on at the entrance, so that the bird must have popped in as a pigeon does. Such a feat fully justifies the opinion that the Comb-Duck is not a clumsy bird."

Harrington also obtained a clutch of five eggs of this duck in Burma from a hole in the bank of a river, caused by a stone falling out, in which a small amount of grass and weed had been collected for the eggs to lie on. The bank was 15 feet above the river.

Everywhere except in Ceylon the breeding season of the Comb-Duck is the same. As soon as the rains start, somewhere between the 10th and 20th June, the Comb-Ducks commence their breeding and nesting operations and during July most eggs are laid, other birds laying throughout August and occasionally into September. In Ceylon they breed in February and March.

The number of eggs laid varies very greatly, probably twelve or fourteen eggs is the normal complement, but very large clutches have been obtained. Mr. A. Anderson found a nest containing forty eggs, of which one was a pigmy, and says that in other cases fifteen and twenty have been brought to him as having been taken from the same nest. Then in the nest described by Aitken (*vide supra*) there were sixteen eggs plus the oviduct egg. Finally, Livesey in Kotah, Rajputana, found a nest containing no less than forty-seven eggs. Of these eggs twelve were quite fresh, while the remaining thirty-five eggs were all incubated for about ten days upwards. These forty-seven eggs Livesey thinks must have been laid by two or more females. In Anderson's find, however, the duck was caught and was found to be greatly emaciated, so the whole number may have been laid by her. On the other hand much smaller clutches are often laid. Hume says he believes seven or eight to be the usual complement and twelve is the maximum I have ever taken.

The eggs are pure white, ivory-white or pearl-white, very polished, smooth and glossy, with a fine close texture and hard but not very thick shell.

One hundred eggs average 61.8×43.3 mm. : maxima 66.7×44.1 and 63.2×45.4 mm. ; minima 56.0×42.5 and 58.0×45.0 mm.

I have no information as to incubation, nest-building etc. of this very common bird.

(2248) *Asarcornis scutulatus* (Müller).

THE WHITE-WINGED WOOD-DUCK.

Asarcornis scutulatus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 387.

From Eastern Assam the range of this duck extends through Burma South to Tenasserim and thence through the Malay States to Sumatra and Java. It is rare in Western Assam, though it occurs

North of the Brahmapootra from Barpeta Eastwards and becomes more plentiful in Tezpur, and is common in parts of Lakhimpur.

Nothing more is known about the nidification of this duck than when I wrote the 2nd edition of 'Indian Ducks' in 1913. Then I wrote as follows :—"All along the foot-hills of the Himalayas (in Assam) there stretches a vast strip of virgin forest, devoid of all cultivation of any sort whatever, but a good deal broken up by swamps and lakes, some so tiny that the trees almost meet over their black stillness, others so wide and big that there may be miles between their opposite banks. In such places as these, especially where pieces of water of the smaller description are numerous, the Wood-Duck may be sought with almost a certainty of success.

"The only egg I have of this species is one which was taken in the Cachar Hills. The nest was taken from a deep hollow, caused by decay, in the first bifurcation in the trunk of a large tree standing on the bank of a stream. The tree was a low but very thick one, and the hollow in which the egg was found was said to be some 20 feet from the ground. The nest was described as a mass of grass and other rubbish with a lining of feathers and down, probably of the bird itself.

"The forest was very dense and consisted almost entirely of trees with practically no undergrowth, while through it there wandered a sluggish, dirty stream, which here and there disappeared into small morasses dotted with tiny pools of clear water.

"I had tried hard to get a shot at two birds we heard calling at this very place but quite failed to get near them, and it was just after this the Cachari found the egg and brought it to me, and I have no doubt as to its authenticity.

"The egg can be matched by those of the Comb-Duck and has the same texture, surface and shape and measures 65.0×48.1 mm.

"The Mikirs in Lakhimpur, who often snared the birds and brought them in to me, said that usually the birds laid their eggs in holes in trees or in the great hollows between the big branches, but that sometimes they made a great platform of sticks and other rubbish, lined with feathers and grass, on a foundation of growing branches. Occasionally they had found nests in scrub-jungle and grass on the edge of small forest ponds."

(2249) *Rhodonessa caryophyllacea* (Lath.).

THE PINK-HEADED DUCK.

Rhodonessa caryophyllacea, Fauna B. I., Birds, 2nd ed. vol. vi, p. 390.

This beautiful duck is found in the Northern United Provinces and Nepal East to Assam and Manipur, in which, and in Eastern Bengal, it probably is resident and certainly breeds. Elsewhere I should expect its occurrence to be casual.

It breeds in the densest forest, Ekra and Elephant grass and, even fifty years ago, when comparatively common, was seldom obtained except, when with a line of elephant-beaters, sportsmen put them up when returning to camp from tiger-shooting. Shillingford has a good account of them which appeared long ago in 'The Asian' sporting paper. He writes :—They "have been observed by myself in considerable numbers in the Southern and Western portions of the district (Purnea), that portion of Eastern Bhagalpur which lies immediately to the North of the River Ganges and South-Western parts of Maldah. They come up to the central or higher parts of Purneah in pairs during the months of April, begin to build in May, and their eggs may be found in June and July. The nests are well formed (made of dried grass interspersed with a few feathers), perfectly circular in shape, about 9 inches in diameter and 4 or 5 inches deep, 3- or 4-inch walls, and no special lining. The nests are placed in the centre of tufts of tall grass, well hidden and difficult to find, generally not more than 500 yards from water. They lay from 5 to 10 eggs in a nest. Both the male and female have been started simultaneously from the nest, but whether the former assists in incubation is uncertain, though, judging from the loss of weight during the breeding season, the male must be in constant attendance at the nest."

I have a single egg of this bird which was taken by Shillingford in Malda in June 1879. The shell is intensely smooth, ivory-white in colour, with a fine close texture. In shape the eggs are very spherical; one egg among five sent to Hume is practically a true sphere measuring 43.4×42.9 mm.

Six eggs average 45.9×42.0 mm.; maxima 47.0×44.2 mm.; minima 43.8×40.6 mm.

Nothing more than the above is known about this bird's breeding habits but, when the young are hatched, the duck proves an admirable mother, and Shillingford notes about one "on the 17th July, 1881, when, while searching for Pink-headers' nests with F. H. at the Northern extremity of Patraka Potal, where nests were reported, we flushed a female Pink-header in the grass jungles of the Patraka jhil. F. H. fired with his miniature express at the bird. Upon our going up to the spot, to our surprise she fluttered about and dragged herself along with loud quackings. Being closely pursued, she flew along at an elevation of about 6 feet from the ground in a manner that led us to believe that she was badly wounded and one of her wings damaged, and she fell, rather than settled, in a patch of grass on high land. On approaching this a similar movement was gone through, and she deposited herself some 100 yards further on. Having decoyed us this far, she flew up into the air with facility. After describing a considerable circuit she came back to the jhil on the banks of which we were standing and took to the grass jungle, and all our endeavours to flush her again proved futile."

Subfamily CHENONETTINÆ.

(2250) *Nettapus coromandellianus* (Gmelin).

THE COTTON-TEAL.

Nettapus coromandellianus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 392.

With the exception of Northern Sind and the most waterless parts of Rajputana the Cotton-Teal may be found in practically any district in the Indian Empire and Ceylon and, again, East to China and South to the Philippines and Celebes.

Wherever there is water and fairly open country there will this little goose or goslet be found, resident and breeding; it does not matter much where the water is or what it is. It is common, of course, on all lakes, swamps and other large pieces of water, still and ready for choice, but it is not a frequenter of rivers, either rapidly flowing with clear water or sluggishly creeping along between muddy banks; I have, however, often seen them on the tidal creeks of the Sunderbunds close to where these link up the great rivers with the swamps and lakes of the districts of Jessore, Khulna and the 24th Parganas.

Quite open country is not a desideratum and they often breed in comparatively small pieces of water surrounded by forest and jungle. Thus in Lakhimpur we not only found them nesting in trees in and around the huge lakes and swamps covering so much of the country, but they also bred in trees on the borders of a small swamp completely surrounded by dense, wet, evergreen forest.

In Rangpur I found many nests, the sites covering all descriptions usually selected by these birds, and always in rather large, natural holes in trees, generally between 6 and 12 feet from the ground, very seldom over 16 feet or so and, sometimes, hardly above the level of the water. The trees in nine cases out of ten were alongside water of some kind. In most districts and provinces the birds prefer trees standing either in the water or on the edges of wider stretches of swamp or lake but, in Rangpur, though many pairs of birds bred in such places, their favourite nesting-holes were in roadside trees. In this town practically every road has—or had in my time—very fine avenues of grand old trees in which holes were numerous and convenient, while on either side of the road ran deep ditches, 6 feet to 12 feet broad, full of water, overgrown with Lotus- and Lily-plants, and fringed with coarse grass and weeds. At the time of which I write, the very early 'eighties, a walk of a few miles along any one of the roads could hardly have failed to produce nests of both the Cotton-Teal and Whistling Teal. These birds also bred freely in compounds where there were large trees close to tanks and pools, while I found one nest on a tree at least 200 yards from the nearest tank. The two birds to which this nest belonged

spent most of the daytime on a tank in the compound of one of the officials, and I examined every hole in every one of the trees growing all round without success, and it was only by accident that eventually I found it in a tree on the opposite side of the house and nowhere near the water.

Very often they make quite a good nest of all sorts of oddments—grass, weeds, twigs, feathers etc.—but it is never lined with down, as are most ducks' nests, only quite small scraps of down being found mixed with the other materials. Sometimes no nest at all is made and the eggs are laid direct on the rotten wood and any other débris which may be lying at the bottom of the hole selected.

Occasionally they choose holes in trees at considerable heights from the ground; Oates took ten eggs from a Mango-tree in Pegu from a hole about 30 feet from the ground, while Coltart took one from a branch of a tree about 25 feet up. Nests in holes in branches are, I think, unusual, the birds nearly always choosing those in the main trunk.

Curious places for nests have often been recorded. Jerdon speaks of their breeding in holes in "ruined houses, temples, old chimneys and the like." Anderson also says they nest "in holes of trees and ruins," while both Cripps and I myself have known of nests made in holes in chimneys of deserted factories.

Blewitt, writing from Jhansi, says of the two nests found by him; that the bird "makes a semi-floating nest on the water, among the rushes or lotus-leaves, of weed, grass, etc., all together." No one else, before or since, has ever seen such a nest and Blewitt surely made a mistake in this instance.

They nearly always select nest-holes with wide entrances but not always. Vidal took nine eggs from a nest in a hole, the entrance to which was only 4 inches across, while I have heard of others still smaller, yet the birds fly in with the greatest accuracy without pause or hesitation.

The principal months for laying are July and August but the eggs may be found from June to September. Occasionally in Assam, when the rains set in early, the birds also breed rather earlier and I have seen eggs in the first week of June, one or more of which must have been laid the last week of May. The normal clutch of eggs is undoubtedly 8 to 12, and Hume says he has never seen more than the latter number. Personally I have twice seen nests containing 22 eggs and others containing 18 and 16, nor had I any reason to think they were the produce of more than one female.

The eggs are a pearly white when fresh, but soon become stained and dirty. In shape they are short, broad ovals, always equal at the two ends; the texture is fine, close and hard and the shells are strong for the size of the egg.

One hundred eggs average 43.1×32.9 mm.: maxima 47.7×33.1 and 46.3×35.6 mm.; minima 38.1×30.3 and 41.3×29.7 mm.

Incubation is carried on by the female alone so far as I have

been able to see and, I think, takes fifteen or sixteen days, the duck not commencing to sit until the last egg is laid.

There are many interesting problems in regard to this little bird which still require solution. First, how are the young taken down from the nest-hole to the ground or water. Personally I believe they are just thrown out by the old birds, fall like bits of fluff on the ground below and are then taken straight into the water. I have, however, been told by a very intelligent Mahomedan shikari quite a different tale, and this I repeat for what it is worth. He told me that early one morning, before dawn, he was walking to his fishing nets in a tank when he saw something flutter heavily down to the water from a tree in front of him and some twenty paces distant. This proved to be a bird, which returned to the tree and again, with much beating of wings, fluttered down to the surface of the tank, this performance being repeated again and again at intervals of some minutes. At first he could only make out that the cause of the commotion was a bird of some kind but, after a few minutes, he, remaining crouched among the reeds and bushes, saw distinctly that it was a Cotton-Teal and that each time it flopped into the water and rose again it left a goslet behind it. These he said he could see were carried somehow or other in the feet, but the parent-bird seemed to find the carriage of the young no easy matter, flew with some difficulty and fell into the water with some force.

I tried to find out how the young got to the water but was defeated, as the birds breeding in my own garden took or dispatched their babies to the tank before day-break.

Another interesting question is that of the large clutches of eggs often found. I have already mentioned clutches of 16 to 22 and I have heard of one of 40 which was without doubt authentic.

Livesey says that in the Shan States, where the Cotton-Teal is numerous up to 4,000 feet, the local people all believe that the birds indulge in communal nesting. In a most interesting letter to me he writes :—"They fight and chase each other a great deal during April and May, and about mid-June begin to take little excursions into the forest in small parties numbering three to seven or more. The sexes are mixed together and there seems to be no rivalry or ill-feeling. They all go and sit on some dead tree in the forest and then a lot of talking goes on, while the females search about for holes in which to nest, looking into all and any from 6 feet up to 70 in great trees. They lay in the end of June and in July but are then very quiet and difficult to locate. The ducks leave the nests, which the drakes possibly then look after, soon after dawn, and it is between then and about 8 P.M. one may see them as they come to water a short time. After this they disappear and there is no sign of them all day. They are said to run a communal nest without any quarreling or signs of bad temper and I have myself seen two females enter the same hole one after the other. The local people, who know the birds and their habits well, and who

take their eggs regularly for food, say that they lay a lot of eggs at the full moon and that they often get 30 or 40 eggs from the same nest and sometimes as many as 90. They cannot explain how the young get down from the nest but believe they do so by themselves, and they have also a belief that the ducks do not sit on the eggs but that these hatch by themselves and that, when hatched, the young fend for themselves."

Subfamily ANSERINÆ.

(TRUE GEESE.)

(2258) *Anser indicus* (Lath.).

THE BAR-HEADED GOOSE.

Anser indicus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 405.

The Bar-headed Goose breeds in Ladak, Tibet and, almost certainly Western China. North they breed in Central Asia to about latitude 55°.

These geese breed in Ladak and Tibet on the big lakes and adjacent marshes from 12,000 to 15,000 feet and possibly higher still.

The first description of the breeding is that of Drew, quoted by Hume ('Game-Birds,' vol. iii, p. 87). The description given is much the same as that I give later on by Bailey, except that Drew says that around the Tso Moriri Lake the Champis told him the birds laid before the ice broke up, *i. e.*, in May, and that when he was there in July all the young birds had hatched. So, also, a few days later, when in the valley of the Salt Lake, he only found one goose sitting on some goslings and two eggs on the point of hatching.

Bailey found them breeding in vast numbers on the Hramtso Lake in Tibet and supplied me with the following excellent account of his experiences :—"On the 2nd June 1908, on my way down from Gyantse to Phari, I left the main road, which skirts the northern shore of the Hramtso—a lake some 14,700 feet above sea-level, and some eight miles long by four broad,—and travelled round the southern side, halting for two days at the village of Hram. The southern shore of this lake is bordered by a belt of marsh, about two miles broad in its widest parts. On this marsh thousands of Bar-headed Geese breed. The villagers of Hram annually collect hundreds of their eggs and sell them at the rate of 30 to the rupee to men who carry them to different parts of Tibet for sale.

"On arriving at the village I sent for some men who could show me where the nests were and we walked the mile between the village and the edge of the lake, carrying with us a flat-bottomed Tibetan skin boat, and I was pushed across a few hundred yards of clear water which was only about 2 feet deep. Here we were on the marsh and could see dry islands ahead of us, white with thousands of geese.

As we neared the first island, my guides pointed out the tracks of men over the marsh, who, they told me, must have come by night, disobeying the orders from Lhasa regarding the taking of eggs this year. At last we reached the first nests. They were situated on a grassy island about 2 feet higher than the marsh. This island was circular and about 20 yards in diameter and contained 15 nests. The nest consists of a slight hollow in the grass, plentifully lined with down, which is banked up all round it. The nests contained from two to eight eggs, the commonest number being four, and the number of birds in the broods that are seen all along the road-side on the Northern shore are almost invariably four. I am inclined to think that, when there are more than four eggs in a nest, some are bad ones which were laid possibly by another bird, as some of the eggs in nests containing more than four eggs are always very discoloured and evidently much older than others, and might, perhaps, have been laid the previous year. I noticed this in one case in which birds were just being hatched from the fresher-looking eggs. These birds seem to lay their eggs in a very promiscuous fashion, for I saw many single eggs laid on the grass outside the nests. As soon as the eggs are hatched the birds leave the marsh and move across to the open water. Apparently the only protection the birds have is the impassibility of the ground between their nests and the shore, as no attempt at concealment of the nests is made.

"The photographs show the individual nests, which appear as white patches, and also the down scattered all over the nesting ground. They also show how the nests are crowded together, the distance between them being frequently less than a yard."

Hume says that in June in Ladak he found nothing but young birds all hatched, but Osmaston found many clutches of eggs, some fresh, at Tso Kar on the 8th June and at Tso Moriri on the 19th. At Tso Kar Osmaston also found them breeding on cliffs. He writes (*Ibis*, 1925, p. 715):—"I decided to explore some cliffs, about a mile from the lake, in search of possible nests of the Brahminy Duck. While inspecting the cliffs from below I was surprised to see the head and neck of a Bar-headed Goose projecting from the ledge above my head. Guessing this must mean a nest and, in all probability, eggs, I shot the bird through the head. The nest was inaccessible without a rope and I was alone. In order to protect any possible eggs I succeeded in throwing my coat on to the nest, where it remained all night.

"Early next morning I returned with three men and a rope and, after some trouble, the nest was reached and found to contain six fresh eggs.

"The nest was that of a Raven, in which a brood of young Ravens may very probably have been reared earlier in the season. It was a dense pad of wool and hair resting on sticks and lined with the down of the goose.

"The fact that at Tso Kar this goose was breeding on the face of the cliff, whereas at Tso Moriri and Shushal they were laying on islands, seems at first strange. At Tso Kar there are no islands and the geese do not apparently feel safe in depositing their eggs on the mainland; hence they seek out more or less inaccessible sites on the neighbouring rocks and cliffs."

Mr. Osmaston everywhere found six to be the maximum number of eggs laid, but there were many clutches of this number.

Kennedy, Steen, Macdonald and many others have sent me numerous eggs and notes from Tibet but there is little to add to the above description of their breeding by Bailey and Osmaston. A curious note sent me by Macdonald runs: "These geese used to breed in incredible numbers at Hramtso and the Tibetans annually collected thousands of their eggs for food. This is now forbidden, and the birds are rapidly decreasing in numbers."

Although it has been repeatedly stated that these geese lay before the ice breaks in early May, it seems certain that only a few eggs are laid before the last week in May and the great majority in early June, while some birds lay right up to the end of that month.

The down in the nest is very pale grey, practically white, with no dark centre, and is very abundant. It not only forms a bed for the eggs to lie on but a deep bank all round and, when the bird leaves the nest, unless suddenly startled from it, it covers the eggs with the down.

The eggs in a full clutch number three to six. When larger clutches are found they seem to be, as Bailey suggests, a mixture of new and old eggs or the produce of two birds.

In tint the eggs are ivory white, turning to dull white in time. They become much stained and soiled by the goose's feet within a very short time of being laid.

In texture, shape and stoutness they are much the same as those of the domestic goose, perhaps rather finer in texture and with a thinner shell.

One hundred eggs average 84.4×55.1 mm.: maxima 91.6×60.4 mm.; minima 74.2×55.2 and 81.0×51.1 mm.

The gander takes no part in incubation and there is no record as to the length of time incubation takes, though the Tibetans told Macdonald that it lasted "nearly thirty days." This is, according to Witherby ('Handbook,' vol. ii, p. 233), two days more than the Grey Lag.

Subfamily ANATINÆ.
(SURFACE-FEEDING DUCKS.)

(2260) *Dendrocygna javanica* (Horsf.).

THE LESSER OR COMMON WHISTLING TEAL.

Dendrocygna javanica, Fauna B. I., Birds, 2nd ed. vol. vi, p. 411.

This is another of the Duck tribe which is found resident and breeding over the whole of the Indian Empire and Ceylon. while outside our limits it extends to China, the Malay Peninsula and Archipelago to Borneo and the Loochoo Islands.

This Whistling Teal frequents much the same kind of country as the Cotton-Teal and where one is there also the other is sure to be found.

Since the second edition of 'Indian Ducks' was written nothing has been added to our knowledge of this bird's breeding, which has been exhaustively known for a very long time. I then wrote:— "Normally and typically both our Indian *Dendrocygnæ* build nests (or use nests) on trees or lay their eggs in their hollows; often they make use of deserted nests of other birds and sometimes they build nests on or near the ground in reeds, grass or bushes.

"Barnes (Journ. Bomb. Nat. Hist. Soc. vol. i, p. 11, 1886) recorded the fact that in Neemuch he never found their nests on trees but always amongst rushes growing on the edges of tanks.

"Oates ('Birds of British Burmah,' vol. ii, p. 273, 1877) says that he has frequently found its nest in "Pegu in July and August—a mass of dead leaves and grass placed on a low thick cane-brake in paddy-land. Those nests I found myself were invariably situated, as above described, in cane-brakes.

"Jerdon also says that it generally breeds in the drier patches of grass on the ground.

"Lastly, Legge writes in 'Birds of Ceylon':—'It sometimes builds in reeds, the nest half floating in the water.'

In Hume's 'Nests and Eggs' a great variety of sites are recorded. Butler says he took the nest from a tussock of grass growing out of a dried stick fence; Doig took them frequently from creeper-covered Tamarisk-jungle growing in water and also found them placed on the tops of clumps of bulrushes.

In Mysore Davidson found their nests also on the ground, where they were placed in tufts of grass which formed islands in the midst of weedy tanks.

In the districts of Eastern Bengal Cripps found them breeding both in trees and on the ground but the few nests seen by myself in these districts and in Sylhet were all in trees.

In Dibrugarh, however, we found that these Whistling Teal nearly always built their nests on high pieces of ground standing in swamps. In July, when the water had risen and had collected in the low-lying land, the birds were busy over their domestic arrangements. Often across these pieces of water the villagers had made raised banks, either to use as a path or as boundary to their own bit of rice-land. The centre of the tops of these banks were, as a rule, trodden bare but the sides were, more or less, covered with dense grass and weeds, some two or three feet high, and in these places the Whistlers made their nests.

They also made use of the high ground surrounding the deeper water, which formed banks in the dry weather but in the rains formed small circular islands.

The nests here were massive structures of grass and water-weeds, and were always very well concealed, the covering grass in every case forming a dome completely covering them and hiding them from sight even when one stood actually over them.

Except in this district I have never seen a nest actually on the ground but have taken one or two from situations very close to it. In Cachar, at the foot of the hills, there is much broken ground, often intersected by nullahs which widen out here and there into small swamps. In these places the Whistling Teal is in his element, with a great variety of sites to choose from. The one I found most often selected was some clump of trees, generally a Babool or a species of stunted, large-leaved, densely foliaged tree which often grows actually in the water. When the rains are on these trees form oases in the midst of a watery desert and, when the floods are at their height, show merely a few feet of their crests above water. On these oases the ducks build their nests, rough and ready constructions of weeds, sun-grass and rushes, rarely lined with a few feathers. Sometimes a good many twigs are used, more especially when the nests are placed on Babool-trees, when, owing to the support being less compact, the nest itself has to be stronger and better put together. The situation next most generally chosen as a site for the nest is up one of the arms of these swamps, which seldom, if ever, have deep water in them yet, at the same time, from collecting moisture drained from the surrounding hills, are always wet and moist. In these places the canes, reeds and other vegetation grow to a great height, often 12 feet or more, and are so rank and tangled that their tops will bear considerable weight.

Sometimes the Teal breed in these, placing their nests where the tangle is densest, generally two feet or so from the top, and greatly protected by the thick growth above both from sun and rain. The nest itself is of the roughest description, a mere thick, coarse pad of grass, reeds and, perhaps, a few creepers, measuring some 18 to 24 inches in diameter and with hardly any depression in the centre.

Now and then a nest may be found on trees close by villages and near a tank or some other small piece of water, in which case it

may be placed in one of the bigger forks or in a large hole or hollow between big boughs; in the former they may be well-built nests, often, possibly, of other birds, while those in the hollows are merely small collections of rubbish.

In Rangpur nearly all the nests I found were on trees and were those originally built by Crows and Kites. If Crows they were nearly always those of *Corvus splendens*, but Hume also records the birds using a nest of the Jungle-Crow, a much neater and more compact affair, which one would hardly think could have contained the Teal's eggs.

Most nests are placed at no great height from the ground and anything over 20 feet would be exceptional, though I have seen one or two at 30 or 40 feet.

There is never any down in the nests of these ducks, though a few casual feathers, big and small, may be moulted and remain in the nest. Everywhere late June to early September is the breeding season and I think few eggs are laid until late in July; this is the case even in Ceylon.

The normal full clutch in my experience is eight to ten, and this agrees with the estimates of Jerdon, Butler, Doig, Davidson and Cripps. Oates says the full clutch in Burma is six or seven but Hopwood and Mackenzie say ten or more. Anderson also notes that twelve or more are laid but in Cachar six to eight only were laid.

Occasionally exceptionally large clutches are laid and I have one record of sixteen and Fynes-Clinton took two clutches of twelve and fourteen, both of which appear to have been laid straight on end by one and the same bird. He found a nest on the 29th June containing twelve eggs, which he took, and on the 13th July he found fourteen more in the same nest.

The eggs are white or ivory-white, very broad ovals, much the same in size at either end, but the texture is not so fine and close as in most ducks' eggs and the surface, though smooth, is often slightly chalky and often becomes much stained. Hume ('Game-Birds') says that the lining to the egg is a delicate salmon-pink but, though I have examined a huge series of eggs, I have never found the inner membrane to be anything but a dull, dead, lemon-yellow, fading to grey-white very rapidly.

One hundred eggs average 46.9×36.8 mm.: maxima 64.0×51.0 mm.; minima 48.7×35.9 and 47.3×35.0 mm.

Both sexes incubate but probably the female does most of the work. Incubation takes twenty-two to twenty-four days. A clutch of eight, the last laid on the 1st July, all hatched on the 24th of that month, but another clutch completed on the 13th July hatched out on the 5th and 6th of August.

Marshall describes how on one occasion he shot the male of a pair of this Whistling Teal but, when he returned the following day, found the female had already obtained another mate, who was sitting beside her close to the nest.

(2261) *Dendrocygna fulva* (Gmelin).

THE LARGE WHISTLING TEAL.

Dendrocygna fulva, Fauna B. I., Birds, 2nd ed. vol. vi, p. 413.

This Whistling Teal has a most extraordinary range. It is found throughout India and Burma, has occurred, and may be resident, in Ceylon, and extends through the Indo-Chinese countries. It is also found over the greater part of Africa from the Sudan southwards, Madagascar, the South-West United States and the Argentine.

In India it is nowhere, so far as I know, nearly as common a bird as its smaller cousin. It is scattered widely, but sparsely, over North and North-West India, gradually becoming more common towards the East until, in Eastern Bengal, it becomes very plentiful. In Assam it is less numerous, though by no means rare. In Burma it again becomes numerous in parts of Pegu but, elsewhere, occurs only in relatively small numbers. Oates says (Birds of Brit. Burm. vol. ii, p. 274, 1877) that it is "comparatively a rare bird in Burma except in the Northern portions of Pegu, where I found it very abundant in the Engmah swamp, 25 miles south of Prome. Captain Wardlaw Ramsay procured it at Tounghoo, and I observed it several times in the paddy-fields near Kyeikpadien, in Southern Pegu, in the rains."

I have one record of its occurrence in Tenasserim and Hopwood obtained it in Arakan.

The only record of its nesting in Hume's 'Nests and Eggs' is that of a nest taken in Saugur, Central Provinces, on the 15th August.

I took about eight or ten nests of this Teal in the Rangpur district, where the bird was not rare. The nests here were all built in much the same position as those of the Lesser Whistling Teal already described. Some may have been old Kites' and Crows' nests renovated and enlarged, but I believe that in most cases they were built by the birds themselves. With the exception of one nest in a large hollow in a road-side tree-trunk all the nests were made of sticks, very roughly put together, unlined and placed about 25 to 35 feet up from the ground, and, generally speaking, this Whistling Teal does nest at much greater heights than the Lesser. These nests were all taken by me in 1884 but, in 1908, an Indian Police friend of mine took two nests, both, he says, old Crows'-nests, from two of the same great Mango-trees which were occupied in my time.

Some nests taken by me in the Sunderbunds were all placed on small trees, often Babool or similar ones, growing on small raised islets in the great swamps of Jessore and Khulna. Here, too, the nests seemed to be self-made, consisting of sticks, twigs and coarse grass very roughly put together, and often with a top-layer of dirty weeds. They measured from 15 to 20 inches across and, perhaps, 4 or 5 deep, with a very shallow depression for the eggs. Most were placed on

tangles of criss-cross branches, one in a stout fork, one in the hollow formed between the lowest boughs of a Mango, one in the crown of a Date-palm, while another was evidently an old nest of a Fishing Eagle.

In Nadia I found one nest built in the jungle round a tank on the race-course, the nest placed on some thin boughs jutting right out above the water of the tank and not more than 6 to 8 feet above it. This nest had, I think, been made by the birds themselves.

I have never seen a nest built on the ground hut, in Assam, the Bhil-fishermen, who were very well acquainted with all the Water-birds, assured me that they sometimes built in the rank vegetation growing at the edges of, or on the small islands in, the big swamps.

The breeding season is the same as that of *javanica*. The earliest eggs I have recorded were those taken in Nadia in the end of June, the latest some taken in Lakhimpur on the 13th October, most eggs being laid between the 15th July and the 15th August.

Six to eight eggs form the usual full complement and I have never seen more than ten in a nest, while I once found four much incubated.

They only differ from those of the preceding bird in being much bigger on an average though some are curiously small compared with the size of the bird.

Fifty eggs average 56.6×42.9 mm. : maxima 60.9×51.0 mm. ; minima 45.2×38.1 and 47.3×38.0 mm.

(2263) *Casarca ferruginea* (Pallas).

THE RUDDY SHELDRAKE or BRAHMINY DUCK.

Casarca ferruginea, Fauna B. I., Birds, 2nd ed. vol. vi, p. 410.

The Brahminy breeds within our limits only in Ladak, while it is even more common still in Tibet. Outside our limits it is found from Southern Europe and Northern Africa, throughout almost the whole of Central Asia, South to the Himalayas and East to China and Japan.

It has not been known to breed below 10,000 feet and Hume says that its nest has been found up to 16,000, while quite probably it breeds yet higher than this.

In the Himalayas its normal breeding site is a hole in a cliff but we have two excellent accounts of it, one in Ladak and the other in Tibet, which brings our information on the subject well up to date.

Of the former country Osmaston writes (*Ibis*, 1925, p. 718):—"These birds are commoner and more generally distributed than the Bar-headed Goose in Ladakh. They were found breeding in the vicinity of every lake, swamp or river over 13,000 feet. They were especially numerous in Rupshu, around the Tso Kar and Tso Moriri Lakes, and at Puga.

"They breed in holes among the rocks on the mountains or cliffs, generally at a considerable distance from the nearest water. Some

birds were seen flying down from their nests from a distance of at least four miles from the Tso Kar Lake.

"The young were first observed upon the water (seven ducklings recently hatched) on the Tso Kyagar Lake on 12th June.

"At Puga (14,300 feet), in the 4th week in June, many broods were seen running about in and around the pools, near the hot springs and borax deposits. Some of these ducklings were only recently hatched; others were as big as teal and had developed their chestnut breast-feathers and scapulars, but none were able to fly. They ran well and were also clever at hiding among rocks. Ravens were usually not far away, ready to pounce on any duckling which strayed far from the mother. Both parents keep with the ducklings and, on the approach of a man, they do their utmost to draw him off by feigning inability to fly.

"The ducklings were brought down to the water from their nest in the hills by the parent birds, apparently two at a time. The method of carrying the young down was, unfortunately, not observed.

"One morning on the Tso Moriri Lake a pair of ducks were seen to fly down from the hills and settle on the water. On nearing the spot two small ducklings, only a day or two old, were seen with their parents. It is surmised that the old birds return to their nest several times, bringing the young down, probably in their bills, two at a time.

"The number of ducklings in a brood seems to vary from five to eight—rarely more—so that four journeys would have to be made, assuming that both the parents do equal shares in the work. It is possible, however, that one bird remains with the ducklings on the water while the other brings down the rest in turn.

"No eggs were obtained, but the time for fresh eggs would appear to be the last ten days of May and early in June."

Next we have Ludlow's account of their breeding in Tibet (Ibis 1928, p. 228):—"One of the most familiar birds in Southern Tibet, where it abounds at all times and in almost all places.

"It usually breeds in holes in banks and cliffs, during the month of May. Sometimes it will construct its nest in ditches between fields and even in Tibetan houses. On 10. vii. 26 an old woman of Kala took me to her house to show me such a nest. She took me into a typically dark Tibetan store-room on the first floor, devoid of all windows except for a miserable hole in the wall sufficiently large to admit a duck of the size of a Brahminy. Immediately in front of this hole, and close to it, an ordinary Tibetan willow-basket, shaped like a truncated pyramid, was suspended from the rafters. The old lady informed me that in this basket a pair of Brahminys had hatched out a brood of eight ducklings a month previously. When they were a few days old she took them out of the basket and placed them on the ground outside, whereupon the birds marched them off to the nearest irrigation channel, which was not far distant.

She also informed me that it was her custom to hang a basket in this place every year especially for the Brahminy to breed in and that, though she had no "lodgers" the previous year, it had been tenanted in 1923 and 1924. I examined the basket and found in it a large quantity of down, obviously that of *Casarca ferruginea*.

"I have not infrequently seen these birds alight and walk about on the flat roofs of houses at Kala and Challa.

"As regards the way the Brahminy conveys its young from holes in precipitous rocks to the ground and thence to the water, Tibetans relate the following, which I give for what it is worth. They say the parent birds do not carry the ducklings either in their beaks or feet or in any other manner, but that one of the parent birds pushes them out of the hole whilst the other bird waits below with outstretched wings to break their fall. They scoff at the idea of the ducklings being carried to water and say that the parent birds march them down to it.

"The greatest number of eggs I have ever obtained in one clutch was five, but this is certainly not the full clutch. Tibetans tell me that the bird often lays from eight to ten eggs."

It seems more than probable that the ducklings march down to the water, taking advantage of any tiny tunnel or irrigation creek which holds water and may help them towards it. We know that geese of various kinds bring their young great distances, just marching them along and letting them swim wherever they can do so, and young Brahminys are just as good walkers as young geese.

Clutches of eggs sent me from Tibet were taken in holes in cliffs except in one instance. This was taken from a hole in the wall of an inhabited Tibetan house. The hole was at the top of the wall, a large beam forming a top to it. The seven eggs were taken, fresh, on the 22nd June, and seven more were laid on the 13th July and eventually hatched out. A nest taken from a narrow crevice in a rock in a cliff-face consisted of coarse grass and scraps of Tibetan gorse with a dense lining of down.

They seem often to breed in very curious places. Hume says that they "lay in holes in trees and even fallen logs, and in deserted nests of birds of prey. Tristram found it breeding in a cliff in Northern Galilee among Griffon-Vultures in May and in the Eastern Atlas with the Raven, the Black Kite and the Egyptian Vulture. He also quotes Prjevalsky to the effect that they sometimes nest in the fire-places of the deserted Mogul villages. Betham records two nests taken by Shuttleworth from holes in trees, in one of these cases there being a Merlin's nest on the same tree, which was 8 miles from water.

The breeding time, judging from the dates on which advanced young have been seen, must begin early in May and continue up to the end of June while, in those instances in which the first clutches have been lost or destroyed, second clutches may be found even in July.

Apparently six to ten or, very rarely, twelve eggs may be found in a clutch, while five only are sometimes incubated.

The colour varies from an ivory white to a creamy white, the latter fading considerably when the incubation is advanced or when the eggs have been kept some time.

In shape they are moderately broadovals, not depressed or pointed at either end.

Eighty-five eggs average 67.0×47.0 mm. : maxima 72.0×49.0 and 68.8×49.5 mm. ; minima 61.5×45.6 and 68.0×45.0 mm.

The down is pure white, purer even than is the down of the common Shelduck.

Anas platyrhynchos.

THE MALLARD.

(2264) *Anas platyrhynchos platyrhynchos* * Linn.

THE MALLARD.

Anas platyrhynchos, Fauna B. I., Birds, 2nd ed. vol. vi, p. 419.

The Mallard is a practically circumpolar bird, in Asia breeding as far South as the Himalayas, where it is very common in suitable localities from 5,000 feet upwards but, so far as we know at present, it breeds nowhere outside the true Himalayas and never in the lakes and swamps in the Assam and Burmese hills well above this height.

They must sometimes breed at very great elevations. Ludlow writes (Ibis, 1928, p. 229) :—"I have seen Mallard at Gyantse in June" (12,000-14,000 feet) "and Colonel Bailey informs me that he saw Duck, almost certainly young Mallard, on the Lhasa marshes in August 1924. It seems reasonable to believe, therefore, that the Mallard breeds in Southern Tibet in suitable localities." I have also had ducks' eggs sent me from Hramtso which I have no doubt are Mallards' eggs, though no bird was sent with them, and they cannot be accepted as proof of the breeding.

In Kashmir they breed in vast numbers, though all my correspondents tell me that since the taking of eggs by the natives for food has been prohibited there has been a great decrease in the number of duck. Ward told me that where formerly ten pairs of birds bred there is now not more than one. Another correspondent, whom I asked to send me down from old nests of the Mallard and White-eye, told me that, though twenty-five years ago he could have gone out any morning in the breeding season and taken all he wanted in an hour, at the present time he might have to hunt long and far before he got a single nest. Formerly the eggs formed

* As subspecies of the Mallard are now generally recognized, trinomials must be used.

a regular article of commerce, boat-loads being collected from nests in the lakes they most frequented.

Even now, however, if one knows where and how to look for them, many Mallards breed in most of the Kashmir lakes.

The nest is generally a rather massive affair, composed of rushes, grass, reed-stems, weeds etc. and then lined with down. This, the down, varies considerably in the individual nests and some birds use far more than others. I have seen nests of this Mallard with a lining of some inches thick and a wall all round deep enough to conceal the sitting bird, while in others the lining the eggs lie on is but sparse and the walls not two inches high. The duck continues to pile up down while she is incubating, and fresh eggs, even when the clutch is complete, are seldom surrounded by much down.

The normal position of the nest is on the ground in thick cover; often it is placed in among the dense sedges, grass and bushes growing at the edge of a lake but equally often under bushes, brambles, or in long pasture-grass at great distances from any water. They are not fond of reed-beds for nesting in, though occasionally nests may be found therein, or, equally rarely, a nest may be built right on the water in among Lilies and water-weeds.

The Mallard often chooses queer places to breed in and the natives say they often breed in trees, either in holes and hollows or in other birds' nests.

In India records of unusual sites are rare but, in England, I have myself often seen nests in trees, either old ones of Crows, Magpies etc. being utilized, or the eggs are laid in some large natural hollow. I have also seen a Coot's nest taken possession of while, on one occasion, a pair of Mallard are said to have bred in a Rook's nest.

In India the Mallard breeds almost exclusively in May and June and, though a few nests may be found in July, I suspect that these are second layings, the first having been robbed. Occasionally the birds lay earlier and I have had eggs sent me from the Wular Lake taken in April.

The usual full clutch is six to ten and either more or fewer are exceptional.

In shape the eggs are rather long ovals and but seldom at all pointed at the smaller end. The texture is fine and close and the surface has a slight or moderate gloss. In colour they vary from quite a bright greenish-grey to a pale dull yellowish-stone or pale buff, but greenish is the more prevalent tint.

One hundred eggs taken in India average 56.6×40.3 mm. : maxima 60.1×42.3 mm. and 59.9×43.0 mm. ; minima 50.1×38.7 and 52.1×37.0 mm. Hartert gives the average of 270 eggs taken in Europe as 56.3×40.9 mm.

The down of the Mallard is very dark; *en masse* it looks almost black, with little grey white spots. Each scrap of down varies from moderate to dark brown, with pale grey-white centres. The most usual flank-feathers are light tan-brown with almost white bases

next the downy parts and then a broad blackish band prolonged and projecting down the centre of the feathers.

Incubation is recorded by Witherby ('Handbook,' vol. ii, p. 272) as twenty-six days.

The male takes no share in incubation, nor have I any record of his helping with the nest.

Anas pœcilorhyncha.

THE SPOT-BILL OR GREY DUCK.

(2265) *Anas pœcilorhyncha pœcilorhyncha* Forster.

THE INDIAN SPOT-BILL OR GREY DUCK.

Anas pœcilorhyncha pœcilorhyncha, Fauna B. I., Birds, 2nd ed. vol. vi, p. 421.

The typical form of Spot-bill Duck is found in Ceylon and, except that it has not been actually recorded from the South Konkan, occurs more or less all over India as far East as Western Assam, Cachar, Sylhet, Manipur and, possibly, Arakan. It has long been known to occur in Kashmir at 5,000 and 6,000 feet, though hitherto it has been held to be a casual visitor only. Livesey, however, says that it is quite a common bird in that State and that in Winter he has seen quite big flocks and that many breed in the lakes.

Where there are suitable pieces of water the Spot-bill ascends the hills to some height. Woods records it as a common bird round Imphal up to 3,000 feet and, in the Tankul Hills, over that height; I found it in North Cachar at about the same elevation; it has also been recorded from the Darjiling Terai up to about 4,000 feet and, as already recorded, it is common in Kashmir up to 6,000 feet.

Their haunts vary greatly but, on the whole, they probably prefer tanks, swamps and lakes which are covered with Lotus- and Lily-plants, with margins of reeds and rushes, rather than large pieces of comparatively open water. They often frequent quite small pieces of water where the jungle comes right down to the water's edge, while, though not often, they may be also found breeding on village ponds and tanks. In Eastern Bengal they keep almost entirely to the huge swamps which extend over much of the country and which are nearly always covered over most of their surface with water-weeds of various kinds, often forming into floating islands strong enough to support a man hurriedly walking over them.

Most nests are placed on the ground or, when in mud or water, just clear of the surface, a favourite site being a thick patch of sedgy bulrush or weed at the edge of the water, in which it can be easily and completely concealed. They often breed in inundated rice-fields and in these they generally place the nests in the dense grass and weeds which grow on the dividing banks or "bands,"

and I have known a nest placed on the side of one these banks, the top of which formed a regular pathway for the villagers from one side of the cultivation to the other.

Nests may sometimes be found in bush or other cover some way from water, but such nests are not nearly so numerous with this bird as they are with the Mallard. At other times they are built in positions well raised above the ground or water. Hume's first nest was "placed on a drooping branch of a tree which hung down from the canal-bank into a thick clump of rushes in a jhil that fringes the canal. The nest was about 9 inches above the surface of the water and was firmly based on a horizontal bifurcation of the bough. It was composed of dry rushes and had a good deep hollow in which down, feathers and fine grass were intermingled. The nest was at least a foot in diameter, perhaps more, and I suppose two inches thick in the centre and four at the sides."

This description of the nest agrees well with those I have seen but Marshall describes one as "about 9 inches across, 3 deep and the sides fully 2 thick."

One *never* finds the down thick enough to form beautiful walls and bed as it often does in the nest of the Mallard, but there is always a little mixed with the other materials and occasionally there is sufficient to form a fairly good bed for the eggs to lie on.

I cannot find any feature to distinguish the down of the Spot-bills from that of the Mallard but in bulk it looks a trifle paler. The flank-feathers are variable and from the same nest I have taken the following:—(1) Like that of the Mallard; (2) white, with a sub-terminal brown spot followed by a nearly complete brown bar; (3) white, with a broad subterminal brown bar or spot.

In Sind Butler found the nests all built in the long grass on small islands in swamps but, apparently, there was no down at all in these. Primrose also said there was no down in a nest found by him in Jellalpur, but a nest with nine eggs sent me from Sind by Eates has quite a lot of down mixed in with the other material.

Over the greater part of its range the Spot-bill breeds during July, August and September but, in many parts of India, odd nests are found at various times of the year. In Eastern Bengal I believe two birds out of three lay in the months mentioned, but I have seen young in April, fresh eggs in August and tiny ducklings in January. Whitehead records (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 11, 1898) that he saw ducklings near Sehore in November, while in Southern India November and December are the two principal breeding months. In Sind it breeds in April and May and again in July, October and September.

There is an interesting note by Mr. C. G. Chevenix Trench on the breeding of this duck. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xxxii, p. 221, 1927):—"On November 8 last I found a Spot-bill's nest with eleven fresh eggs, and to-day, some 80 miles North of the place, flushed another Spot-bill which had some ducklings

with her." The editors add a note to the effect that the Spot-bill frequently breeds twice a year. Although this appears very probable I have no definite proof so far that they do so.

Seven to nine eggs form the normal-sized clutch, but six and ten are not infrequently found, while Hume says they lay up to twelve.

The eggs are very like those of the Mallard but are more generally drab-buff or grey-buff and seldom have the green tint so common in the eggs of that bird. The texture is also the same but, on an average, they are rather broader ovals.

One hundred eggs average 56.0×42.3 mm.; maxima 60.1×42.2 and 56.2×44.0 mm.; minima 50.0×38.9 and 52.1×37.0 mm.

Incubation takes about twenty-four days and I do not think the duck commences incubation until the last egg is laid. The male takes no part in this, but is a very good father and helps to look after the young.

(2267) *Anas pæcilorhyncha haringtoni* Oates.

THE BURMESE GREY DUCK.

Anas pæcilorhyncha haringtoni, Fauna B. I., Birds, 2nd ed. vol. vi, p. 423.

This race of the Grey Duck extends from Eastern Assam to the whole of Burma, Shan States, Yunnan and Cochin China.

This duck was not uncommon in Lakhimpur, where I found two nests, one with three eggs on the 6th February and one with a single egg on the 13th April. In this district the birds frequented the big swamps and marshes to some extent but kept to well-covered patches where there were ample reeds and rushes and where the surface of the water was covered with Lotus- and Lily-plants. More birds, however, were to be met with on comparatively small pieces of water, such as offshoots of the bigger swamps running in between forest and jungle. Occasionally I saw a single bird or a pair in small patches of water actually surrounded by forests but at the same time one could not call them forest birds.

The nest I found on the 6th February was placed on the ground in some scrub-jungle on a mound in a rice-field. A shot at Snipe startled the duck and my second barrel, fortunately, rolled her over and then, to my great surprise, an examination of the bushes discovered the nest. This was quite a well-built one of grass and reeds with a fair amount of down. It was placed in a hollow under a thick bush and snuggled in among fallen dead leaves and rubbish. The nest may have been a foot across and a couple of inches thick at the bottom, while the raised walls were at least two inches high and broad with a slight rim of down. The second nest and a single egg with the parent duck, trapped on the nest, were brought in to me by a shikari who had been out with me when I found the first. The two were within a quarter of a mile of one another, and the second in a similar position to the first.

Since I wrote the 'Fauna' Mackenzie has sent me two clutches of this duck's eggs—one of six taken by himself at Promé on the 7th July and another taken by Macdonald at Pakokku on the 14th November. The nests, apparently, were very similar to those found by me but were built in reeds and scrub by the edge of a swamp. In both nests there was a fine amount of down, as much almost as one would get in most nests of the Common Mallard. The only other nest I know of is one taken by Harington in the Shan States on the 14th June.

From the above it will be seen that it is almost impossible to give the breeding season with any degree of accuracy, as clutches of fresh eggs have been found in February, April, June and July, a much incubated set in June and another slightly set in November.

Macdonald also says that eggs were brought to him in October and that he saw young a few days old near Panzo in December.

So too, one cannot say what is the normal number of eggs laid, as both six and fourteen have been found more or less incubated, while the other clutches taken have obviously been incomplete.

The clutch of eggs taken by Macdonald are almost white and they range from this to a dull light buff.

Twenty-seven eggs average 52.7×39.6 mm.; maxima 61.3×44.1 and 59.1×44.4 mm.; minima 49.1×39.1 and 56.2×38.8 mm.

The down is, of course, exactly like that of the Common Spot-hill, while the flank-feathers have dark incomplete bars or spots on a buff ground, sometimes the one basal bar, sometimes two and sometimes the second broken into two spots. Feathers from the posterior flanks have a basal dark bar prolonged in the centre into a broad medial streak. Taken *en masse* the feathers and down of the Mallard and of the various Grey Duck are not distinguishable.

Livesey in an interesting letter to me about this duck says that they are very common in the Shan States, breeding in the Inlé Lake between 3,000 and 4,000 feet. He also says "there is no doubt that this duck moults all its flight-feathers at once after breeding, and while the quills are growing the birds stick very closely to thick cover and are very hard to dislodge from it. The breeding season seems to be very late in the year."

(2273) *Nettion albugulare* Hume.

THE ANDAMAN TEAL.

Nettion albugulare, Fauna B. I., Birds, 2nd ed. vol. vi, p. 435.

The Andaman Teal is found in the Andamans and Cocos Islands. Specimens have also been shot at Bassein, where it is probably only a straggler and on the Great Cocos and Landfall Island, where they are very likely resident.

Wimberley records a nest of this bird, containing one egg, taken in a paddy-field near Port Mouatt. The nest was said to have been

on the ground and to have been composed of grass. It was probably only a nest and egg of the Whistling Teal.

Osmaston notes (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 491, 1906) :—"The Oceanic Teal arrives in Port Blair in large numbers towards the end of May, where they remain until October or November.

"In the winter months they frequent outlying fresh-water jheels such as are found near Craggy Island, North Reef Island, Niell, The Brothers, Templegang and other places. They breed, so far as my experience goes, invariably in lofty and often in dead trees, and the eggs are, therefore, very difficult to procure.

"A man brought me down ten eggs from near the top of a huge Padouk-tree on August 4. They were nearly fresh.

"They are rather long, elliptical ovals, cream-coloured and much discoloured."

These eggs which I should call, now that they are cleaned, a pale pearly cream, average 49.0×36.3 mm. : maxima 51.2×36.3 and 48.1×37.3 mm. ; minima 47.3×35.8 and 49.0×35.7 mm.

I have never seen any down of this Teal.

(2277) *Marmaronetta angustirostris* (Ménétriés).

THE MARBLED TEAL.

Marmaronetta angustirostris, Fauna B. I., Birds, 2nd ed. vol. vi, p. 445.

In India the Marbled Teal only breeds in Sind, Baluchistan and the Mekran. Bulkley thought it also bred in Guzerat and it may do so, though there is no certain proof as yet.

A. B. Aitken long ago (Journ. Bomb. Nat. Hist. Soc. vol. xxii, p. 807, 1914) recorded its breeding in Baluchistan. About June he found a pair of Marbled Teal with fourteen ducklings on Khushdil Khan Lake, at about 5,000 feet elevation.

Butler received some eggs from the Mekran coast which he attributed, correctly, to this duck. Of these he writes :—"I received some small ducks' eggs from the Mekran coast which are, in my opinion, those of the Marbled Duck. The nest was on the ground under a solitary Babool-bush growing on an extensive tract of salt marsh, some 7 or 8 miles north of Ormarra, called Meerputty, and consisted, according to the account of the native who found it, of a collection of finest twigs formed into a solid pad with a few pieces of down as a lining, and measuring 8 or 9 inches in diameter. The eggs, eight in number, were taken on the 19th June, 1878."

At about the same time as this Barnes had some eggs sent to him by the Frere Museum, also said to have been taken on the Mekran coast. Finally, in 1915 Ludlow obtained eggs, young birds and adults. He records these as follows (Journ. Bomb. Nat. Hist. Soc.

vol. xxiv, p. 368, 1916) :—"Sonmeani is a coastal village of some importance about 50 miles from Karachi in the State of Las Beyla, Baluchistan. About the middle of May I sent my collector there prospecting for eggs and, on his return, he informed me that he had seen appreciable numbers of Marbled Teal, as well as Shovelers and Garganeys, on a large jheel, several miles in extent, in the vicinity of the village. He was informed by the local people that a certain number of duck year after year hatched out their broods on the jheel. I sent him back to investigate matters and, on his return on the 20th June, he brought me back eggs which, from his description of the bird, coupled with the texture, size and coloration of the eggs, I took to be those of the Marbled Teal.

"To make sure he was sent out again to shoot a specimen for identification. He did better than this and brought in a pair of young Marbled Teal alive.

"Two nests were found by him on 14th June on his second visit, one with a clutch of twelve (incubated) and the other with a clutch of nine (unincubated). The nests were found on an island in the middle of the jheel, and were constructed within a thick tussock of grass completely shrouded from view. A grass tunnel track betrayed the means of entry. The female, when distracted, performed the broken-wing trick.

"My collector told me that he was informed that eggs of this bird were found annually and that, when fresh, they were generally taken and eaten. On his third visit he found several other nests containing broken egg-shells, the young having hatched out.

"He volunteered the remark that at least a dozen broods must have hatched out on this jheel."

The nests are fairly well made of grass, rushes and sometimes, apparently, also of Tamarisk-twigs etc. The lining of down varies, and in nests taken in the hot climate on the Mekran and Baluchistan coast there seems to be very little of it, while in Temperate Europe there is, with incubated clutches, generally a fine bed of down with walls of the same all round. The down is pale grey-brown with a still paler centre, while the flank-feathers are white with pale brown bands, varying considerably in size etc. and, to a lesser extent, in depth of colour.

Outside India they breed throughout South Europe, North Africa and West Temperate Asia to India.

Everywhere they breed apparently in May and early June and all our Indian eggs have been taken in these months, while Pitman also obtained them in Mesopotamia in the same.

The clutches run very large. In Sonmeani they were as much as twelve, whilst in Europe they are still bigger, and General G. v. H. Clarke took clutches from twelve to fifteen in Spain. In Mesopotamia Livesey took a clutch of seven but, as they were quite fresh, they may not have been a complete clutch.

The eggs are quite typical ducks' eggs, in colour pale creamy and in texture hard, close and fine, the surface decidedly glossy, while the shape is rather long, elliptical oval.

One hundred and twenty-two eggs average 46.5×34.2 mm. : maxima 50.6×33.4 and 47.7×38.0 mm. ; minima 42.4×32.9 and 46.6×31.5 mm.

Nyroca rufa.

THE WHITE-EYED POCHARD.

(2280) **Nyroca rufa rufa** Linn.

THE WHITE-EYED POCHARD.

Nyroca rufa rufa, Fauna B. I., Birds, 2nd ed. vol. vi, p. 453.

This Pochard is found in the Western Palearctic region as far East as the Valley of the Ob.

In India it breeds in the Himalayas and is very common in Kashmir from 5,000 feet upwards, wherever there are suitable bushes and marshes. Ward says that it also occurs in Ladak, though Osmaston did not meet with it there. In Tibet Ludlow says (Ibis, 1928, p. 230): "I also found it common on the Hram Tso in July and it undoubtedly breeds there, though I found no eggs. Walton says it was the commonest Duck in the Lhasa marshes in August and September, and records the shooting of a flapper in the former month."

The White-eyed Pochard may be found on almost any kind of water but only breeds on those lakes where there is ample cover. It does not, however, breed anywhere in the plains of India, not even in Sind, while about 5,000 feet will be found to be its lowest breeding elevation.

Normally this little duck breeds in reed-beds, making a good nest of reeds and rushes, a distinctive feature of which is a lining of finer strips of grass and reed-blades and rush-leaves. Hume refers to this and says "the interior of the nest is composed of finer materials."

Bates again says of two nests taken by him on the Dal Lake that one "had quite a good lining of fine strips of reed and fine grasses," while the other nest "was of rushes with an inner lining of strips of flags and rush-blades mixed with fine grasses."

The nests of some Pochards remind one much of those of the Coot and Moorhen, but the present bird's nest hardly does so. It may occasionally be built in among reeds in water, but this is the exception. Many are wedged in among the tangle of broken-down reeds and rushes which fringe so many of the Kashmir lakes. Where the reeds are on dry ground the nest will be very low down,



NEST AND EGGS OF THE WHITE-EYED POCHARD.
(Hokra Lake, Kashmir, 18. 6. 21.)

often actually resting on the ground but, when the reeds are growing in mud and water, they are sufficiently raised not only to be kept clear of the water, but also high enough to allow of some flooding. At other times nests are found in positions more like those selected by the Mallard, such as a hollow in deep pasture-grass, the edge of some ditch or piece of irrigation water where it is tucked away under a bush or covering of weeds. Hume also says that it is placed sometimes on "more or less floating weeds and supported on masses of water-plants." This last is, I think, an unusual site, though where the floating islands of weed, so common on the Kashmir lakes, have also a growth of weed and rush well above the water-line there Pochards will sometimes breed in them.

The nests are amply lined with down, scanty at first but, by the time incubation is advanced, sufficient to form a fine bed and walls.

The down is very dark, a blackish-brown with a pale centre looking in bulk much like that of the Mallard, but with shorter, finer filaments.

The whole nest measures about 10 to 14 inches across, while the depth is about 4 or 5, with a fairly deep depression for the eggs, sometimes of a depth of 3 inches.

The breeding season lasts from about the 15th May to the 15th July, most eggs being laid in the first half of June.

The clutch varies from eight to ten eggs, occasionally only six or seven being laid, rarely as many as twelve.

Of the eggs Hume writes :—"The eggs of this species are at once distinguished from those of any other duck laying within our limits with which I am acquainted by their well-marked, though delicate, *café-au-lait* tint, which, however, has often a faint greenish tinge. In shape they are commonly very perfect and regular ovals, moderately broad as a rule, but occasionally a good deal elongated and slightly compressed towards the large end. The shell is very smooth and fine but has very little gloss."

Except that I have never seen an egg with a greenish tint or one compressed at the larger—or the smaller—end, there is little to add to the above.

In Hume's time these ducks' eggs were collected for the market in boat-loads and probably Hume saw thousands. Nowadays they are very rigorously protected, none are taken for food and the breeding birds have greatly decreased in numbers.

One hundred and fifty eggs average 51.7×37.9 mm. : maxima 62.8×36.0 and 57.0×43.0 mm. ; minima 48.3×37.7 and 49.1×35.1 mm.

Incubation, I have been told, takes twenty-four or twenty-five days.

Subfamily MERGINÆ.

(MERGANSERS and SMEWS.)

Mergus merganser.

THE GOOSANDER.

(2228) *Mergus merganser orientalis* Gould.

THE EASTERN GOOSANDER.

Mergus merganser orientalis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 472.

The Eastern Goosander is a bird of the higher Himalayas from Afghanistan and Turkestan to Tibet and the hills of Northern China.

They probably nest in suitable localities at elevations between 12,000 and 15,000 feet and possibly a great deal higher. They frequent the great lakes on the lofty plateaus with mountainous cliffs close by, the former supplying them with water to feed in, and the latter with nesting-places.

Osmaston says that in Ladak (Ibis, 1925, p. 719) "these birds were observed singly or in pairs in the Tso Moriri and Pangong Lakes; also on the Indus at about 13,000 feet. They were not common. They breed in both these localities, but no nests were found. A bird with her brood of five ducklings was seen on the Indus on the 27th June."

In Tibet Ludlow says (Ibis, 1928, p. 231) "this bird is fairly common on the Nyang Chu and on the Amo Chu throughout the year. It breeds in May and June in holes in the river-banks or in the adjacent hill-side. I have never taken its eggs, but have often seen young birds early in July."

Mr. Macdonald succeeded in obtaining for me two clutches of eggs which he sent me together with the parent birds and nests. A note to the following effect accompanied the eggs etc.—"These nests were both collected for me by my son John, the eggs being laid in nests in crevices in some cliffs which you can hardly believe are nearly three miles away from the Hram Tso Lake, where the birds feed. The face of the cliff was steep and crumbling and broken, so the nests were very hard to get at, although the cliff was by no means perpendicular. The nest consisted of fallen rubbish and just a little grass which may have been placed there by the birds. In each case they were behind boulders, so that the eggs lay in a hollow which was completely filled with down but very dirty. These are probably very late clutches, as there are already chicks swimming about on the lake."

Other nests from which the young had been hatched were reported. These were in various places, one in a burrow of some sort on almost

level land, another in a hole in a bank and one even under a huge boulder lying on the flat. Most, however, are said to be made in holes and crevices in the cliffs and often at great distances from water.

The above two nests sent me were so exceedingly filthy, especially the bed of down on which the eggs lay, that I had to wash, clean and bake them before I dared to put them away in my cabinet.

The down is a very pale grey, very like that of the Common Goosander but still paler, this being possibly due to the baking and washing. The filaments are very small and there is no central dark or pale spot.

As ducklings have been reported as swimming about on various lakes the first week in June some birds must lay very early in May, but possibly most eggs are laid about the end of that month and others up to the 20th June. The two sent me by Macdonald were taken on the 7th and 8th of June, both clutches of seven—one fresh, the other slightly incubated.

The full complement of eggs is probably six to ten. It is unsafe to judge from the number of young seen with their parents, as so great a percentage of these come rapidly to grief. A clutch of six sent me, and now in the Davidson collection, were said to have been incubated, and five newly-hatched young have been seen with their parents as also have ten young.

The eggs are replicas of those of the Goosander but darker and smaller. In colour they are a pale buff or stone-buff, the texture hard, close and fine, the shell stout and sometimes fairly glossy.

Twenty eggs average 64.6×44.8 mm. : maxima 67.0×44.2 and 64.0×45.8 mm. ; minima 62.8×45.8 and 64.0×43.5 mm.

Jourdain (Witherby's 'Handbook,' vol. ii, p. 384) gives the average of 125 eggs of the Goosander as 68.3×47.1 mm., considerably larger than those of our Indian birds. The eggs also are much darker on an average, though I have seen one clutch quite pearly white.

Witherby (*in loc. cit.*) gives the period of incubation for the British bird as "about four weeks."

Order XV. PYGOPODES.

(GREBES and DIVERS.)

Family PODICEPIDÆ.

(GREBES.)

Podiceps cristatus.

THE GREAT CRESTED GREBE.

(2290) **Podiceps cristatus cristatus** (Linn.).

THE GREAT CRESTED GREBE.

Podiceps cristatus cristatus, Fauna B. I., Birds, 2nd ed. vol. vi, p. 477.

The Great Crested Grebe breeds over the greater part of Europe, Northern Africa and Northern and Central Asia to the Himalayas and adjacent plains.

In India it breeds, but apparently only rarely, in Kashmir, but in great numbers in some of the lakes of Ladak and Tibet. It also certainly breeds sporadically in the plains and, perhaps, in some places regularly. In Assam in the great swamps North of the Brahmapootra two or three pairs of birds may be seen during the breeding season in most years, whilst, in others, I have completely failed to find one pair. Of course the swamp- and lake-lands are very extensive and no one can cover a fraction of them in a few days; at the same time these birds generally frequent the same breeding-ground year after year and, once found, one would expect to find them again. Even in Europe, however, the birds forsake their breeding haunts suddenly and for no visible cause, and the same kind of thing may have happened in Assam.

It has also been recorded as nesting in Karachi, Oude and in the Doab, but all these latter instances have referred to casual and not regular breeding.

The birds will be found only in large stretches of swamp and lake and are not seen in small ponds, tanks etc. except very rarely as fleeting visitors. They also require water which has reeds, rushes etc. round their borders or which have beds and islands of floating weeds and rushes etc. dotted about them.

Ludlow (Ibis, 1928, p. 231) writes of the breeding near Gyantse :—
“ I found this bird breeding in large numbers on the Kala Lake on 7. 7. 25. There were several colonies.

"In one place where the stream from the Hram Tso empties into the Kala Tso I found a colony of approximately fifty pairs of birds nesting at a distance of two hundred yards from the shore. Tibetans are not fishermen and no boats were obtainable on any of the lakes, so how to reach the nests was a problem. First of all I tried wading in the hope that the water would prove as shallow as it is on the eastern shore of the Hram Tso. I had not proceeded very far before I realized that this was quite out of the question. Obviously the only thing to do was to build a raft of some sort. So with the enthusiastic assistance of Captain R. L. Vance, I.M.S., I unhinged the two entrance doors of the Kala Dak Bungalow, lashed them together and fixed two galvanized iron bath-tubs on either side to act as floats. But, having launched this weird craft, we found, to our dismay, that it drew too much water and submerged the tubs. So we had to try some other device. We then borrowed half a dozen poles from the neighbouring village, fastened two outriggers to take the place of the bath-tubs and, after a trip in shallow water, decided we possessed a craft of reasonable stability. With an empty box for a seat, a rafter from an adjoining barn for a punt-pole, a shovel for a paddle in case of deep water, plus my gun, camera and a few egg-tins, I then set out on my voyage.

"Progress was slow, and the course somewhat winding owing to the tangled masses of water-weed, but eventually the breeding-ground was reached. Having shot a bird for identification purposes, I proceeded to inspect the nests. They were floating masses of water-weed, 18-24 inches in diameter, and almost every nest contained eggs. I never found more than four eggs in a clutch and in most cases the eggs had been covered with weeds before the birds left them. The eggs when fresh are a chalky greenish-white, but they soon become stained a deep chocolate by the combined action of weeds, water and sun. In some nests I found white and stained eggs lying side by side, which looks as if birds occasionally make mistakes and lay in each others nests. While surveying these birds through binoculars from the shore I noticed that the male frequently sat on the nest alongside the brooding female.

"In July 1926 I again visited the Kala Lake. The Grebes were not breeding in the same place but, through my glasses, I could see colonies of them far out in the centre of the lake. There are no rushes on the Kala Lake, so the birds must always construct their nests wherever there are tangled masses of water-weed. If they did not do so their nests would be blown ashore by the fierce winds which periodically sweep over this lake even in summer."

The elevations of these lakes, Hramtso and Kala Tso, are between 13,000 and 14,000 feet.

They breed, but perhaps not regularly, in the Khudil Lake, near Quetta, at about 5,000 feet. In 1913 Meinertzhagen says (Ibis, 1920, p. 194) that three nests with eggs were found by Mrs. Aitken

on the 12th August; in 1914 there was only one pair present, perhaps not breeding.

The breeding season is a late one. Theobald says that in Kashmir they lay in the second week in May, possibly thinking that the season was the same in Europe, though he actually records taking a nest with five eggs in that month. Elsewhere in India they breed from June to August.

Three or four eggs form the normal complement; five may be occasionally met with, though from six to nine have been recorded.

Superficially the eggs are a chalky white but, under the top layer of calcium, the shell is a very pale sea-green, much paler than the sub-calcium shell of the Cormorants and Shags. The superior calcium deposit is also much more strongly laid on and does not come away in flakes and fragments as it does in the eggs of those birds.

The shell itself is stout but the grain not very close or fine. In shape the eggs are long ovals, often pointed at both ends, sometimes considerably so.

Jourdain (Witherby's 'Handbook,' vol. ii, p. 495) gives the average of one hundred British-taken eggs as 54.8×36.7 mm.: maxima 62.7×37.8 and 46.5×39.0 mm.; minima 46.5×39.0 and 55.3×34.0 mm. Witherby, in the same volume, says that incubation takes about four weeks and that the birds are sometimes double-brooded.

I have myself ascertained that both sexes take part in incubation and in building the nest. The eggs are very seldom left uncovered, as, if they were, they would be very conspicuous, whereas, covered, nests and eggs look like dirty lumps of floating weed. The speed with which the eggs are covered as the bird leaves the nest is really astonishing—a flick or two of the head, or a kick back as the bird leaves the nest and the eggs are invisible.

Both ways of covering the eggs are employed. A bird which we could watch as she leisurely prepared to leave the nest covered her eggs by moving the weeds with her bill, but another whom we saw always jumped off her nest, seeming to kick back as she dived, and thus covering them quite as effectively.

Podiceps nigricollis.

THE BLACK-NECKED GREBE.

(2291) **Podiceps nigricollis nigricollis** Brehm.

THE BLACK-NECKED GREBE.

Podiceps nigricollis nigricollis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 480.

This Grebe breeds over the greater part of Europe and throughout Temperate and Central Asia to China and Japan.

In India it has only, so far, been recorded, by Meimertzhagen, as breeding near Quetta. He writes (Ibis, 1920, p. 194) of this bird {—

"There were none at Khushdil in 1913. In 1914 five pairs arrived during the first week of May, and on visiting the lake again on 20. vi. I found them there in hundreds, and located over seventy nests with eggs, all confined to about an acre of water two feet deep. The nests were entirely made of weed-stalks and measured from 15 to 18 inches across at the top. They mostly contained three eggs; two contained five eggs. In only a few cases were they concealed by weeds.

"Unfortunately, owing to a heavy rainfall about 27. vi., the water rose two feet, flooding all the nests, which were firmly attached to the bottom. On revisiting the lake on 11. vii. all the birds had left.

"This case of the Eared Grebe breeding in northern Baluchistan is interesting, as showing that the species migrates in flocks, that it breeds in colonies, and that it firmly attaches its nest to the weeds at the bottom, for the structures, still with the eggs, could be seen two feet under water on 11. vii."

The above is the total volume of our knowledge of its breeding in India. Outside our limits we know that it breeds in colonies just as it does in the Khushdil Lake, and it makes nests similar to those described but attached to surrounding vegetation and not to weeds at the bottom of the lake.

The normal clutch of eggs is three or four, rarely five, and they only differ from those of the Crested Grebe in being smaller.

One hundred European eggs measure, according to Jourdain, on an average, 43.9×32.0 mm. : maxima 48.5×32.0 and 40.0×34.0 mm. ; minima 39.0×27.1 mm.

Podiceps ruficollis (Vroeg).

THE LITTLE GREBE.

(2292) *Podiceps ruficollis capensis* Salvadori.

THE INDIAN LITTLE GREBE.

Podiceps ruficollis capensis, Fauna B. I., Birds, 2nd ed. vol. vi, p. 481.

The Little Grebe is found over the whole of the Indian Empire and Ceylon wherever there is sufficient water for its not very exacting needs.

East it extends to Yunnan and Siam, while it also occurs over the greater part of Africa and South-West Asia to India.

This little bird is easily satisfied in its breeding requirements. They may nest most commonly and in the greatest numbers on the wide extents of marsh, lake and swamp which are to be found from Sind on the West to the Sunderbunds and Burma on the East, but its nest may also be found on tiny village ponds, where it shares a few square yards of not over-clean water with the village washerman, or it may even be found making its home in the broad

ditches which border so many of our roads in Eastern Bengal. It does not, however, resort to great bare lakes or reservoirs where there are no weeds, no fringe of reeds and no cover for them to attach their nests to. I have never found them nesting on rivers as their European cousin does, or even in the backwaters running off the rivers themselves.

Occasionally they build in colonies, usually rather scattered, but sometimes nesting quite close together. In Lakhimpur, Cachar and Sylhet many of the big bheels had their colonies, numbering half a dozen to a dozen pairs, breeding within a range of 100 yards or so. More often, however, each pair breeds by itself and has its own domain, which it jealously guards from other birds of its own species. When breeding all together they seem to have no special territory and to live, fish and feed quite happily all together. So, too, if two pairs breed in close proximity to one another there appears to be no quarrelling over boundary rights etc.

The nest is always, I think, attached to growing weeds or rushes of some kind. It may be built well inside a reed-bed, in among the reeds, resting on the water but always fastened to one or more of the stems of the weeds even when these are so close together that there is no fear of drifting. More often they are placed at the edge of the reeds where they are thin and scattered, while at other times they are some yards from the actual beds, anchored to a few scant spikes of reeds which sway backwards and forwards on the surface together with the nest.

Nests may also be found attached to floating weed-beds but this is unusual, though I have seen them sometimes in among Lotus-flowers, fastened by weeds to their stems. Always, so far as I have observed, the nests are so fastened that as the water rises or falls the nests rise and fall with it.

Meinertzhagen refers to this (*in loc. cit.*):—"Resident at Khushdil and breeding freely. Over one hundred and fifty bred there in 1913, and in 1914 I found over a hundred nests on 20. vi., mostly containing three eggs; several had four, one seven, and one six. In nearly every case the eggs were concealed by weeds. The nests were made of weed-foliage and not stalks, and never measured over 12 inches across the top.

"When the previous species (Black-throated Grebe) was flooded out, this Grebe scored by having its nest floating, and on 11. vii. all eggs were hatched except in two cases."

The above is the largest colony I have heard of but Betham found colonies of some size near Baroda.

Curious nests are sometimes to be met with. Hume found some "fixed to the branches of a water-overhanging tree a couple of feet above the water." Bingham obtained others near Reya-ka-tal "on tussocks of grass more than half immersed in water. There was no construction in the nest; they were merely little heaps of decayed rushes and grass."

Most nests are just little floating pads of water-weeds, of which the long foliage and not the stalks are always used. Some have a few rush-leaves or stalks added and some have a good many. I have seen some of these floating pads not more than 6 inches across and few as much as 12 inches. The depression for the eggs is generally shallow, an inch or less in depth. This is generally damp, often quite wet and sometimes with a considerable amount of water.

Williams has an interesting note on their nesting on the Khushdil Lake, already mentioned by Meinertzhagen (*Journ. Bomb. Nat. Hist. Soc.* vol. xxxiii, p. 613, 1929) :—"The nests are close together and are floating masses of weeds, rising slightly out of the water. The egg-cavity is a shallow depression, generally half full of water, which is of the same temperature as the egg. The temperature of the water in the lake is much lower; whether this warmth is derived by the chemical action of the partially decayed leaves is not known."

This chemical action, which certainly does generate heat, may be the reason why these birds leave their nests and eggs for so long. Hume says :—"I doubt whether the birds sit much during the day, as I have watched a pair that had a nest, containing five much-incubated eggs, nearly a whole day, and found that they never left the comparatively open water, in which they were feeding, for the dense rush in which we found the nest next morning, for more than five minutes at a time."

The breeding season of the Little Grebe is governed by the rainfall and the filling up of the lakes, ponds and swamps in which it breeds. Over most of its Northern range the majority of eggs are laid some time between the end of June and September and, I think, many birds have two broods. In Ceylon they are said to lay in January and December and again in June. In Southern India it breeds principally in May and June but Williams found it breeding in April at Bangalore. In Deesa Butler took numerous nests in August, September and October. Theobald says that in Kashmir it breeds in May, but eggs have been taken in every month up to October. In the Bombay Presidency Davidson and Wenden obtained eggs from June to September. In the Nilgiris Davison records their breeding in May and early June while, in Burma, Oates, Harington, Livesey and many others obtained eggs everywhere throughout the rainy season.

The number of eggs in a full clutch is generally four or five; both three and six are often incubated and Betham took eight in a nest in Baroda.

The eggs are typical of those of the family, the curious shape, with both ends pointed, being even more common in the eggs of this species than in those of the others.

Two hundred eggs average 35.4×25.2 mm. : maxima 40.0×24.0 and 35.5×26.5 mm. ; minima 29.1×23.4 and 35.1×23.1 mm.

Both sexes share in incubation and in making the nest, much of the material for which is collected by diving.

Witherby gives the period of incubation, according to various authorities, as varying from eighteen to twenty-four days but, in India, I think the first is correct. A swamp visited on the 3rd July in Lakhimpur had many nests with one or two eggs only but, when re-visited on the 26th, all had hatched out, including some which had five young ones, which would give a maximum of eighteen days. Other nests which had no eggs when first seen had clutches almost ready to hatch.

The Little Grebe is not so invariably careful to cover its eggs as are its bigger relations and I have often come on eggs without the usual weed-protection over them. Williams said that he found the same on Khushdil Lake and put it down to the fact that the absence of Crows made the concealment of the eggs unnecessary.

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